Concurrent Schwannoma and Meningioma in Thoracic Spine: Case Report and Review of Literature

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Abstract

In this study, we report a rare case of primary concurrent schwannomas and meningiomas arising at the level of T₁₁ and T₈, respectively. A 39-year-old female was admitted in our department for both lower limb weaknesses. The medical history of patient revealed progressive weakness in both lower limbs and right lower limb intermittent claudication for about a half year, the symptoms worsened in recent one month that presented with flaccid paralysis of both lower limbs. MR images demonstrated the level of T₁₁ and T₈ intraspinal occupying lesions. Resection of the mass effectively decompressed the spinal cord. Histopathological examination showed that extradural mass at the level of T₁₁ was schwannoma and intradural mass highly attached to dura matter was meningioma at T₈.

Introduction

Concurrent primary spinal tumors are rare, except for in genetic disorders, such as neurofibromatosis and von Hippel-Lindau disease [1-4]. Furthermore, concurrent tumors with different histological types arising in the same spinal level are markedly rarer, with only six cases reported to date [1-6]. In this study, we report a rare case of primary concurrent schwannoma and meningioma arising at the level of T₁₁ and T₈ in thoracic spine, respectively.

Case Presentation

A 39-year-old female was admitted in our department for both lower limb weakness. The medical history of patient revealed progressive weakness in both lower limbs and right lower limb intermittent claudication for about a half year, the symptoms worsened in recent one month that presented with flaccid paralysis of both lower limbs. MR images demonstrated the level of T₁₁ and T₈ intraspinal occupying lesions. Resection of the mass effectively decompressed the spinal cord. Histopathological examination showed that extradural mass at the level of T₁₁ was schwannoma and intradural mass highly attached to dura matter was meningioma at T₈.
hospital 2 weeks later.

**Discussion**

Schwannomas and meningiomas are relatively common spinal tumors, comprising 30% and 25% of all spinal cord tumors, respectively [3-5]. Approximately, 75% of schwannomas arise in the intradural extramedullary region. A total of 15% of the lesions are found exclusively in the extradural area, and the rest have both intradural extramedullary components [7]. Regarding tumor origin, 70% of schwannomas are derived from the sensory nerve rootlets, 20% from the motor nerve rootlets, and the rest are derived from both sensory and motor rootlets [7-8]. Schwannomas are more frequently found in the high cervical region, i.e., C1-C3 levels, than in other spinal levels.

Among the tumors arising in the high cervical spine, those arising from the C2 nerve root are the most common, comprising 15% of all spinal schwannomas [7]. Meanwhile, spinal meningiomas account for 12% of all meningiomas and 25% of all spinal cord tumors. Approximately, 80% of meningiomas are found in the thoracic spine and 15% are in the cervical spine; meanwhile, tumors rarely develop in the lumbosacral region [4,9].

Radiological diagnosis of schwannoma and meningioma is very necessary, i.e. MR images. Schwannomas are typically well-circumscribed tumors derived from the peripheral nerve [3]. Schwannomas are usually depicted as iso- or hypo signal intensity on T1-weighted MR images and hyper- or mixed-signal intensity on T2-weighted MR images [1,3,10]. In contrast-enhanced MR images
(T1+C), the tumor is well enhanced but often shows ring-like or irregular enhancement depending on the degenerative changes within the tumor [1,10-12]. Meanwhile, meningiomas tend to be small, single tumors and are typically found in the intradural extramedullary region [1,3]. Approximately 10% of spinal meningiomas coexist with other tumors in the intra- and extradural location, and a few cases located in the extradural space have been reported as well. Meningiomas appear as iso- to slight hypo-signal intensity on T1-weighted MR images, and iso- to slight hyper-signal intensity on T2-weighted MR images [1,3]. The tumor is homogenously enhanced on post-contrast T1-weighted MR images and may be accompanied with dural tail sign [10,12]. In arising region, Meningiomas often arise posterolateral to the spinal cord in the thoracic spine and anterolateral to the cervical cord. By contrast, schwannomas generally originate from the dorsal rootlets and are usually found in the dorsal or dorsolateral side to the spinal cord [13]. In our case, enhanced contrast in T1-weighted MR images accompanied with dural tail sign was detected in the T8 level and the tumor arises from, anterolateral to the spinal cord. By contrast, ring-like enhancement in T1-weighted MR images contrast was detected as an extradural lesion adjacent to the right foramen extending to dorsolateral side to the spinal cord in the T8 level. Therefore, we primarily anticipated this case is extremely likely to be a rare concurrent schwannoma and meningioma arising at the thoracic spine in the different levels.

Schwannomas and meningiomas are relatively common spinal tumors, but concurrent spinal tumors consisting of schwannoma and meningioma are extremely rare. Multiple primary spinal cord tumors are rare, and only 1.2% to 9.5% of such tumors arise in patients with neurofibromatosis [2]. They have been reported in literature as genetic disease, particularly Neurofibromatosis type 2 (NF2), which is clinically diagnosed by Manchester criteria [14]. Apparently, this case does not conform to the criteria and should be considered as a case of primary concurrent schwannomas and meningiomas arising at the different thoracic level. Excluding the cases with neurofibromatosis, only six cases of concurrent spinal cord tumors with different histology in the same spinal level have been reported in the literature. In our report, we demonstrated the additional one case of such rare instance (Table 1).

The diagnoses of our case were difficult according to clinical manifestation, because clinical features were common characteristics of spine tumors and lack of specificities. Contrast-enhanced MRI was significantly helpful to diagnosis and differentiates tumor pathological types by determination of tumor location, enhancement features and relationship to dura matter and/or nerve rootlets. Therefore, MR imaging became the best examination. In-operation, “from simple to difficult” principle should be followed, thus the functions of spinal cord and nerve rootlets could be protected in the maximum extent [15]. Histological examination was still gold standard to diagnoses, our case showed the presence of discrete tumors at the different thoracic spinal level. Surgical intervention is still the most suitable strategy to this case.

**References**


**Table 1:** Manchester criteria[1] for clinical diagnosis of NF2 according to primary finding.

<table>
<thead>
<tr>
<th>Family history</th>
<th>Unilateral vestibular schwannoma or two NF2-associated lesions (meningioma, glioma, neurofibroma, schwannoma or cataract)</th>
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</thead>
<tbody>
<tr>
<td>Unilateral vestibular schwannoma</td>
<td>Two NF2-associated lesions associated with the disorder (meningioma, glioma, neurofibroma, schwannoma or cataract)</td>
</tr>
<tr>
<td>Multiple meningiomas</td>
<td>Unilateral vestibular schwannoma or two NF2-associated lesions (glioma, neurofibroma, schwannoma or cataract)</td>
</tr>
</tbody>
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(T1+C), the tumor is well enhanced but often shows ring-like or irregular enhancement depending on the degenerative changes within the tumor [1,10-12]. Meanwhile, meningiomas tend to be small, single tumors and are typically found in the intradural extramedullary region [1,3]. Approximately 10% of spinal meningiomas coexist with other tumors in the intra- and extradural location, and a few cases located in the extradural space have been reported as well. Meningiomas appear as iso- to slight hypo-signal intensity on T1-weighted MR images, and iso- to slight hyper-signal intensity on T2-weighted MR images [1,3]. The tumor is homogenously enhanced on post-contrast T1-weighted MR images and may be accompanied with dural tail sign [10,12]. In arising region, Meningiomas often arise posterolateral to the spinal cord in the thoracic spine and anterolateral to the cervical cord. By contrast, schwannomas generally originate from the dorsal rootlets and are usually found in the dorsal or dorsolateral side to the spinal cord [13]. In our case, enhanced contrast in T1-weighted MR images accompanied with dural tail sign was detected in the T8 level and the tumor arises from, anterolateral to the spinal cord. By contrast, ring-like enhancement in T1-weighted MR images contrast was detected as an extradural lesion adjacent to the right foramen extending to dorsolateral side to the spinal cord in the T8 level. Therefore, we primarily anticipated this case is extremely likely to be a rare concurrent schwannoma and meningioma arising at the thoracic spine in the different levels.