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A Giant Schwannoma at Conus Medullaris Cause Weakness of Lower Extremities: A Case Report

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Abstract

Introduction: Spinal schwannoma can occur anywhere along the spine, although it is most frequent in the cervical and thoracic areas. It is predominantly made up of well-differentiated schwann cells, which are benign and usually find in the intradural-extramedullary region. Unless the schwannoma is large enough to compress the spinal cord and nerve roots, it produces little neurological effects. Conus medullaris syndrome is a rare complication of spinal schwannoma.

A case report: A 40-year-old woman presented with lower back pain, radiculopathy, lower limb weakness. Magnetic resonance imaging shows a well-defined intradural, extramedullary mass compressing onto the conus medullary region at D12-L2, size # 67 mm × 21 mm × 18 mm, these patients had their tumors removed with microscopic assistance. On histopathology, a schwannoma was found. The patient did better after surgery and had no neurological deficits. Furthermore, there was no need for radiotherapy.

Conclusions: A case of giant intradural-extramedullary schwannoma at the conus medullaris, affecting the lumbar nerve root and attached to the filum terminale. Microsurgical radical resection was used to treatment, which resulted in significant symptom improvement.

Keywords: ***Benign; Intradural extramedullary; Conus medullaris syndrome; Spinal schwannoma***

1. Introduction

Spinal tumors are classified by their position, with intradural, extramedullary, and extradurally being the most prominent. It generally occurs in the fourth-fifth decades of life, with a tendency for males [1]. However, some reports say that there is no gender preference [2]. Spinal tumors represent approximately 5%-10% of all tumors in the central nervous system. 70% to 80% of these are intradural extramedullary in nature. The most prominent tumors found in this area are Schwannomas and Meningiomas [2] with schwannomas accounts for 30% (0.3-0.4 cases per 100,000 people), meningiomas accounts for 25% (0.32 cases per 100,000 people), neurofibromas, teratomas, lipomas, and metastatic tumors [3].

Schwannomas are nerve sheath tumors that arise from the neural crest and develop slowly. It is made up predominantly of well-differentiated Schwann cells located in the peripheral nerves and is often related to neurofibromatosis. It hardly has any clinical signs and symptoms in the early stages. When a patient arrives with neurological signs and symptoms, the diagnosis is usually late. Pain, motor and sensory changes, and sphincter disturbances are the most common symptoms.

Magnetic resonance imaging (MRI) with contrast enhancement, computerized tomography (CT) scanning and potentially CT myelograms are among the diagnostic options and help contribute to make strategies of treatment. The microsurgical radical resection is the preferred treatment [4]. The report would like to present a clinical case with purposing description of a rare case of a giant schwannoma at conus medullaris cause weakness of lower extremities while discussing clinical presentation, etiopathogenesis, and treatment methods.

2. Case Report

A 40-year-old woman with a history of back pain for two years, her symptoms worsened by bending or turning and walking, decreased when she was sitting, her low back pain got more serious, so she was admitted to the hospital. Neurological examination: low back pain spread to the two legs with weakness of lower extremities, making the patient unable to walk, mild disorder of urination, especially she cannot sleep in a supine position, but can only sleep in a sitting position. Lasègue's sign: left leg 50º, right leg 70º. Schober Flexion: 12/10 cm, positive Neri’s sign. Nerve reflexes are normal. No sensory deficits.

Magnetic resonance imaging shows a well-defined intradural, extramedullary mass compressing onto the conus medullary region at D12-L2, size # 67 mm × 21 mm × 18 mm (FIG. 1). The mass was of low intensity in medullary tissue for T1 imaging and of slightly high intensity in the T2 sequence, with homogeneous enhancement after gadolinium injection. Its limits were well defined, occupying 80% of the posterior and left spinal canal without bone destruction or foramen invasion, suggesting schwannoma or meningioma as the first option. No other lesions were present along the neuroaxis, including the posterior fossa. Because the tumor was present in the left spinal canal, these patients undergone microscopic assisted excision of the tumor from D12 to L2 (FIG. 2A). We discovered only minor adhesions to the spinal dural mater, which were gently removed but had not penetrated the spinal cord. The medulla was not damaged during the gross absolute resection. Anatomical and pathologic analyses were carried out. The biopsy tissue indicated hyperplasia of nucleated spindle cells, tumor cells layered many layers running in many directions to build bundles and intersect, and histopathology revealed a schwannoma (FIG. 2B). There were no other irregular cell images discovered.

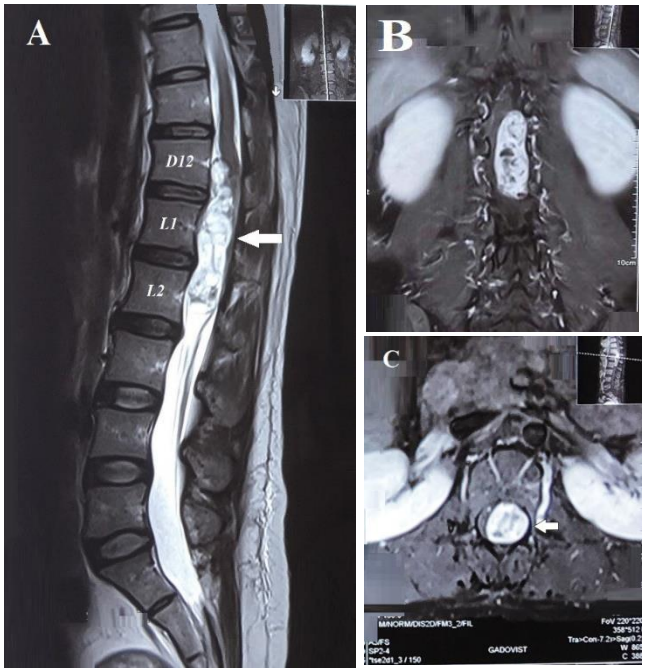

FIG. 1. **Magnetic resonance imaging shows a well-defined intradural, extramedullary mass compressing onto the conus medullary region at D12-L2, size # 67 mm × 21 mm × 18 mm. The mass was of low intensity in medullary tissue for T1 imaging and of slightly high intensity in the T2 sequence, with homogeneous enhancement after gadolinium injection. (FIG. 1A. sagittal plane, FIG. 1B. coronal plane, FIG. 1C. axial plane).**

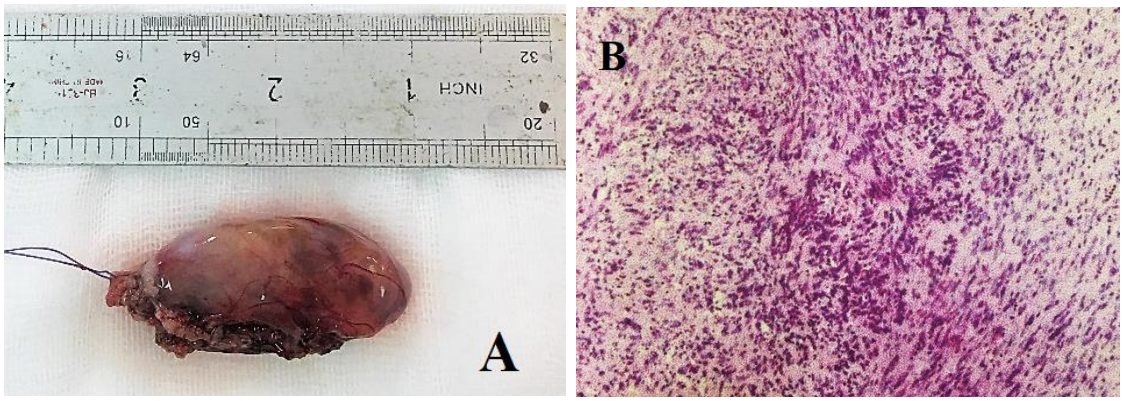

FIG. 2. **FIG. 2A. Image of macroscopic tumor after gross total resection without damage to medulla. FIG. 2B. The biopsy tissue showed hyperplasia of nucleated spindle cells, tumor cells layered many layers running in many directions to create bundles and intersect. No other abnormal cell images were found. Conclusion: Schwannoma.**

3. Discussion

Schwannomas are slow-growing, benign nerve sheath tumors that arise from the neural crest and are more prevalent outside the CNS, primarily affecting peripheral nerves and subcutaneous tissue. As schwannoma develops in the CNS, it accounts for about a third of all spinal nerve root tumors (29%) [5]. The tumor may appear at any age, with a highest prevalence between the ages of 40 and 60, with no gender preference [5]. The rate of morbidity and mortality was stated to range from 0% to 6% [6].

The significance of the first signs varies depending on the tumor's stage. The pain is confined in one (tumor) location, often spreading to both sides, usually only for a short time, but always in the same location and as sharp as a knife. The root pain is initially due to a disruption in nerve conductivity caused by direct or indirect nerve root inflammation or root compression by the tumor [7,8]. Later on, as the spinal cord is compressed further, the spinal tracts are weakened and myelopathy occurs [9,10]. In the lumbosacral field, furthermore, motor weakness is rarely the first symptom. With lumbar canal stenosis, motor weakness of the lower extremity can not be evident until later.

Most often originating from lumbar dorsal sensory nerve roots, MRI of spinal schwannomas shows a well-circumscribed T1 iso-/hypointense and T2 hyperintense nodular intradural mass with related enhancement [11]. Heterogeneous signal amplitude and ringlike enhancement are typical in this setting because cystic degeneration is associated with larger schwannomas. Where there is neuroforaminal expansion, the tumor can take on a dumbbell shape [11]. Imaging studies are essential in the evaluation and treatment preparation process. On T1-weighted images, signal amplitude of intradural schwannomas is equal to or less than that of the spinal cord, and on T2-weighted images, signal intensity is hyperintense. Cystic portions refer to areas of greater hyper-intensity, while hypointensity reflects hemorrhage, thick cellularity, or collagen deposition. These varying appearances aren't often indicative of cancerous shifts. Schwannomas are typically posterior tumors with a well-defined cleavage plane.

In patients that have had surgical excision, the rate of recurrence is estimated to be <5%, and it typically happens many years after the original procedure [12]. This allows for complete resection of the tumor, resulting in the best prog results and a lower risk of recurrence. A complete laminectomy was used to surgically remove a tumor from the spinal cord. This makes access and simulation easier. Seppälä MT et al. identified a series of 187 patients who had their spinal schwannoma surgically resected and had good outcomes. In this study, 62.5% of the tumors were resected, with a surgical complication rate of 37.5% [13]. Due to damage to the musculoligamentous structures and posterior bony components, total laminectomy may result in spinal weakness and kyphosis. By compressing the spinal cord or nerve roots, these complications may cause neurologic symptoms. A total laminectomy with arthrodesis or a unilateral partial laminectomy is needed to avoid such complications. As a result, after undergoing complete laminectomy, our patient was given PLIF to help support her spine.

The heterogeneous appearance of these neoplasms is clarified by their histology findings. Antoni type A tissue is densely packed with cells and consists of rigid bundles of fibrillated cells, whereas Antoni type B tissue is devoid of cells and consists mostly of loose stromal tissue. Additionally, cystic degeneration and xanthomatous modifications can be present [6]. S100 protein is expressed intensely and generally, and SOX10, LEU7, and calretinin are all expressed similarly [5]. In the case of hereditary schwannomatosis, a mosaic pattern of SMARCB1 (INI1) expression is present in 93% of tumors and 83% of NF2-associated tumors as a genetic marker [14].

4. Conclusion

Spinal schwannoma may develop in any part of the spine. It may grow to be very large, compressing the spinal cord and causing neurological deficits, similar to our giant intradural-extramedullary schwannoma at the conus medullaris. Magnetic resonance imaging (MRI) with contrast enhancement is a diagnostic option that may aid in the development of treatment strategies. The recommended approach is microsurgical radical resection.

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