

# A Long-Segment String of Bead-Like Schwannoma of Cauda Equina: A Case Report

## Kauda Equinanın Boncuklaşma Gösteren Uzun Segmentli Şivannomu: Olgu Sunumu

### ABSTRACT

Spinal schwannomas are one of the most common intradural extramedullary spinal tumors. However, a string of bead-like intradural extramedullary schwannoma is highly uncommon. In the paper we present a case of a long-segment string of bead-like intradural extramedullary schwannoma of cauda equina from L2 to S2. The patient had been suffering progressive low back pain and sciatica with progressive neurological deficits for three years. She was misdiagnosed as lumbar disc herniation at her first time of hospitalization after a simple lumbar computed tomography (CT) scanning and a discectomy. We found her tumor by magnetic resonance imaging (MRI) and totally removed it. We therefore emphasize differentiating this almost completely curable tumor from other lumbar diseases such as lumbar disc herniation. It is suggested that a reasonable and careful strategy of surgery for these tumors is important.

**KEYWORDS:** String of bead-like, Schwannoma, Cauda equina

### ÖZ

Spinal şivannomlar intradural ekstrapomedüller bölgede en sık görülen tümörlerdir. Bununla beraber spinal şivannomların boncuklanma şeklinde dizilimi oldukça nadir görülmektedir. Olgumuzda, lomber 2. omurdan sakral 2. omura kadar uzanan boncuk tarzında dizilim gösteren spinal şivannom saptanmıştır. Hastada 3 yıl içerisinde giderek ilerleyen bel-bacak ağrısı ve nörolojik fonksiyon kaybı tesbit edildi. Hastaya çekilen lomber bilgisayarlı tomografide lomber disk tanısı konularak diskektomi yapılmıştır. Daha sonra çekilen lomber manyetik rezonans grafisinde boncuk tarzında dizilim gösteren intradural-intrapomedüller kitle tesbit edildi. İkinci operasyonda tümör tamamen çıkarıldı. Bu vakadan çıkarılan sonuç, lomber disk hernisi gibi benin lezyonlarda mutlaka ayırıcı tanıda Spinal şivannom gibi iyi huylu tümörler de akla gelmelidir. Bu tümörler dikkatli bir planlama ile uygun bir şekilde çıkarılabilir.

**ANAHTAR SÖZCÜKLER:** Boncuklaşma, Şivannoma, Kauda equina

Wan JUN<sup>1</sup>

Kang YI-JUN<sup>2</sup>

Zhang XIANG-SHENG<sup>3</sup>

Wan JING<sup>4</sup>

1,2,3 Xiangya Second Hospital,  
Central South University,  
Department of Spine,  
Changsha, China

4 College of Basic Medical,  
Central South University,  
Department of Physiology,  
Changsha, China

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Correspondence address:

**Kang YI-JUN**

E-mail : f2kangyijun@163.com

### INTRODUCTION

Spinal schwannomas, one of the most common intradural extramedullary spinal tumors, are often benign tumors arising from spinal nerve root sheaths (6, 8, 14). Most spinal schwannomas are solid and solitary with some presenting dumbbell or cystic signs (9, 11), and a string of bead-like intradural extramedullary schwannoma is highly uncommon. What is presented here in the report is a case of a long-segment string of bead-like intradural extramedullary schwannoma of cauda equina from L2 to S2 and we call attention to differentiating this almost completely curable tumor from other lumbar diseases such as lumbar disc herniation. A reasonable and careful strategy of surgery for these tumors is important.

### CASE REPORT

A 56-year-old female was admitted to our hospital for "progressive low back pain and sciatica with progressive neurological deficits for three years". Two years ago, she was suspected of lumbar disc herniation after a simple lumbar computed tomography (CT) scanning at a local hospital. Later a lumbar discectomy was performed with laminectomy at the L4/L5 segment, followed by a two-year active rehabilitation program. Due to little relief of symptoms, the patient was referred

to our hospital for further diagnosis and treatment. Neurological examinations revealed her paraparesis of two legs, reduced muscle strength of bilateral quadriceps (4/5) combined with absence of ankle reflexes. No sphincter dysfunction was observed and physical examination results were normal, with no signs of neurofibromatosis. X-rays showed a feature of post-operation of lumbar discectomy with laminectomy at the L4/L5 segment. Magnetic resonance imaging (MRI) without enhancement demonstrated an intradural extramedullary string of bead-like lesion in cauda equina from L2 to S2 (Figure 1A,B), isointense in T1- and T2-weighted imaging with respect to the spinal cord. All the above ensured the patient suffered from a case of intradural extramedullary tumor of cauda equina. With pre-operative work done, a posterior midline approach was performed. Durotomy was performed in all segment of lesion; a string of bead-like tumors was visible in one nerve root of cauda equina (Figure 2). Total resection of the invaded nerve root by the tumor and decompression of the spinal canal were completed with a L2-S2 laminoplasty, and we also performed a pedicle screw fixation in L4/L5 segment in order to maintain the stability broken in the last surgery. Pain was relieved immediately after the surgery and the histopathological examination revealed a spinal schwannoma (Figure 3). In the following six months, the patient experienced a significant decrease of back



**Figure 1:** On sagittal (A) T1-weighted image and (B) T2-weighted images, MRI demonstrates a string of beads like tumor of cauda equina from L2 to S2 with isointense on T1-weighted images and markedly hyperintense on T2-weighted images.



Figure 2: Dissected tumor.

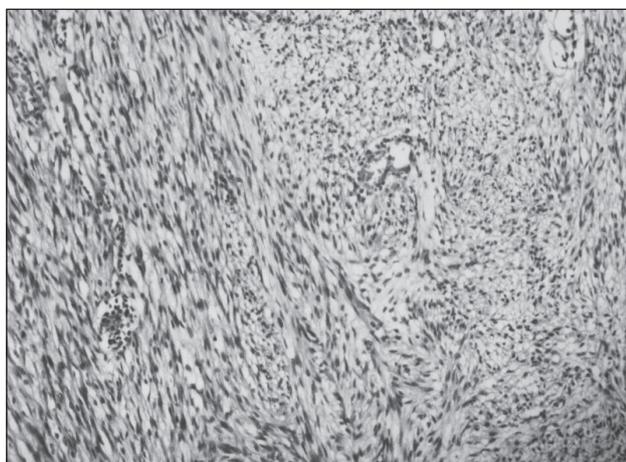


Figure 3: Histopathological examination shows a characteristic of an Antoni A-type schwannoma. H&E, original magnification×100.

pain and sciatica but continued to complain about a slight numbness of both legs. No recurrence of tumor was observed and neurological function was almost completely recovered.

### DISCUSSION

Spinal schwannoma of cauda equina can mimic common complaints of low back pain and sciatica which can be easily observed in clinical practice, so it makes differential diagnosis of low-back-pain difficult (2,10,12). It is therefore clinically important to differentiate a spinal tumor of cauda equina from other lumbar diseases such as lumbar disc herniation. First of all we emphasize the importance of the correlation of clinical features and symptoms of the patients. Symmetrical lower back pain and/or pain that radiates to both lower extremities and

increases in the supine position are characteristics of spinal tumors of cauda equina (2, 3, 13). Other clinical features of spinal tumors of cauda equina include progressive neurological deficit, involvement of several nerve root levels and intractability of the condition to conservative therapy. Secondly, more attention should be paid to the correlation between clinical features and radiology image findings such as computed tomography (CT) (1). As mentioned in our case, the misdiagnosis was due to ignorance of correlation between the clinical features and radiology findings and overvalued CT results.

In our case, it was hasty and irresponsible to make a diagnosis only after a simple computed tomography (CT) scanning when the patient was first hospitalized, and she was given an unnecessary lumbar discectomy, which resulted in the lumbar screw fixation in second surgery (to maintain stability in this segment).

We performed the MRI imaging at our hospital. MRI is the most useful method for the differentiation of spinal tumor from other pain-causing low back lesions such as lumbar disc herniation (8). In MRI imaging, schwannomas commonly appear isointense on T1-weighted images and markedly hyperintense on T2-weighted images (5). That clearly indicates a diagnosis of intradural extramedullary tumor before operation. We recommend that MRI should be utilized as the first-line tool to assist diagnosis of low-back-pain disease, especially when encountering confusion about clinical features. If possible, an enhanced MRI is suggested to guarantee the preciseness of the diagnosis. However, we did not perform the enhanced MRI in this patient due to concerns regarding medical cost.

Our case is unique because the spinal tumor had a string of bead-like intradural extramedullary components. It was located posteriorly from L2 to S2 with the biggest 'bead' in L4/L5 segment. No previous literature has reported such a long-segment spinal schwannoma of cauda equina with a string of bead-like structure. We think the tumor originated from one nerve root of cauda equina and formed a string of bead-like structure. The 'beads' contained cells of schwannoma and the 'string' was actually the involved nerve root. The cause of such a structure is uncertain. It is interesting to note that our patient's tumor resulted in confusion of clinical features due to its long-segment occupation in dural sac and

continuous growth even after lumbar discectomy was performed, especially in L4/L5 segment.

Total dissection is the optimal choice of treatment for spinal schwannomas (4, 7). In our case the tumor was firmly attached to only one nerve root of cauda equina which made total dissection easy. We totally removed the tumor by resecting the involved nerve root with a microsurgical knife. We do not routinely use synthetic dural substitutes or glue. We thought a good closure in layers and placement of a cerebrospinal fluid (CSF) drainage tube would reduce the risk of wound leaks. A pedicle screw fixation was also performed in our case to maintain the stability of L4/L5 segment broken in the last surgery. However, laminoplasty is enough to provide the space of operation of resection of tumor and we do not advocate any pedicle screw fixation when performing this surgery.

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