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Case Report

Treatment for multiple segmental thoracic spinal canal stenosis

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Abstract: This report describes a special case of thoracic spinal canal stenosis, which is rarely mentioned in the literature. Thoracic spinal canal stenosis is unusual because it is caused by comprehensive elements and involves multiple segments of the thoracic spine. Compared with the cervical spinal stenosis and lumbar spinal stenosis, thoracic spinal canal stenosis has lower morbidity. This patient underwent twice decompressive laminectomy. Computed tomography and magnetic resonance imaging revealed that the ossification of ligamentum flavum and posterior longitudinal ligament had compressed the thoracic spinal cord. Osseous hyperplasia of the vertebral body had also contributed to the compression. Before the first surgery, the compression was clearly referred to the T2-T6 and T8-T10 levels. Before the second surgery, the compression was at the T10-T11 level. Therefore we performed decompressive laminectomy at the T2-T6 and T8-T10 levels in the first operation and at the T10-T11 level in the second operation. In both operations, we found severe adhesion between the ligamentum flavum and the endorachis. The calcified and ossified ligamentum flavum was carefully removed. After the operations, the patient's symptoms of thoracoabdominal zonesthesia and numbness of the lower extremities were resolved. Many factors can lead to thoracic spinal canal stenosis. Diagnosis of thoracic spinal canal stenosis depends on clinical symptoms and imaging studies. Various symptoms occur depending on the segments which are referred to and the degree of spinal cord compression. Different ways of operation are chosen due to the causes of thoracic spinal stenosis. Different individuals who suffered from thoracic spinal canal stenosis may have different curative effect after the operations.

Keywords: Thoracic spinal canal stenosis, element, ossification

Introduction

Thoracic spinal canal stenosis (SCS) that refers to multiple segments of the thoracic spine is a peculiar clinical condition. Various factors can cause thoracic SCS, including ossification of the ligamentum flavum (OLF), ossification of the posterior longitudinal ligament, thoracic disc herniation, and osseous hyperplasia of the vertebral body [1]. OLF is the most important factor that leads to this disease [2]. Local mechanical stress [3], tissue degeneration, metabolic abnormalities, and several genetic factors are all causes of OLF. Additionally, OLF and ossification of the posterior longitudinal ligament have similar characteristics [4, 5]. The present report describes a case of thoracic SCS and myelopathy, which has rarely been reported in the literature.

Case report

First surgery: A 53-year-old woman presented with a 5-month history of progressive thoracoabdominal zonesthesia and numbness of the lower limbs. The patient also had a 7-month history of weakness of the lower extremities. The numbness and weakness had aggravated for 2 months before presentation to the hospital. Neurological examination revealed 3/5 strength in both lower limbs. The body was hypoalgesic below the level of the cartilago ensiformis. The Babinski sign was positive, and the knee and ankle reflexes were brisk. Computed tomography (CT) and magnetic resonance (MR) imaging revealed thoracic SCS at the T2-T6 and T8-T10 levels (**Figure 1**). CT revealed the degree of SCS from the transverse position (**Figure 2**). Laminectomy and decompression were performed at the levels of the affected segments

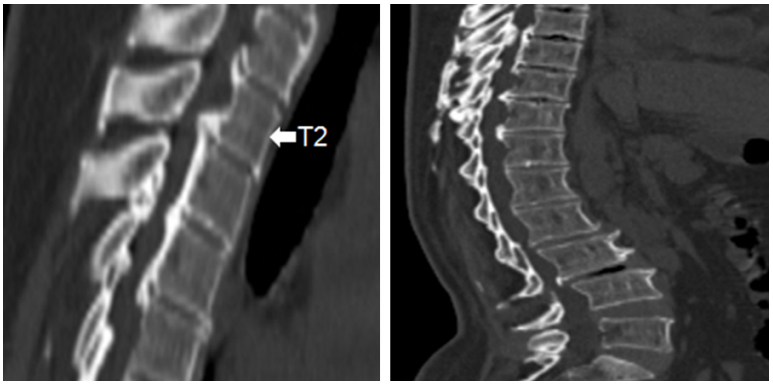

Figure 1. Preoperative sagittal computed tomography of the thoracic spine revealed hyperplastic bone and calcified posterior longitudinal ligament in front of the spinal cord, and ossific ligamentum flavum at the back of the spinal cord. A bone bridge has formed on the posterior edge of the adjacent vertebral body.

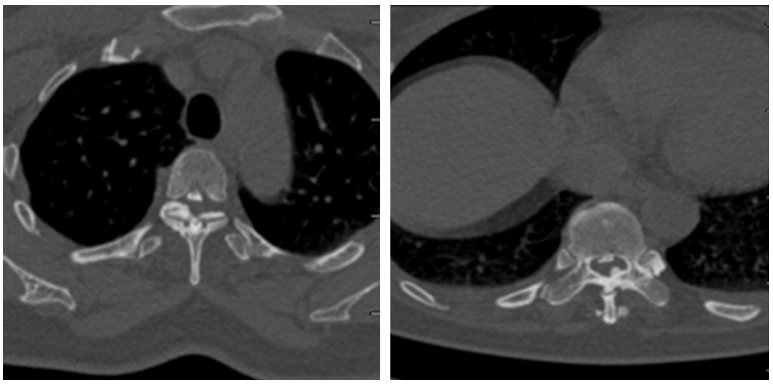

Figure 2. Axial CT scan shows the spinal canal narrowing due to the abnormal ossification. Compression occurred from both the front and back side.

(**Figure 3**). The relative posterior segments of the vertebral plate were partly removed, and obvious OLF was observed. Severe adhesion was present between the ligamentum flavum and the endorachis. The patient experienced resolution of her symptoms and could walk with a stick 1 month after the first surgery.

Second surgery: Ten months after the first operation, the thoracoabdominal zonesthesia and numbness of the lower limbs returned. Neurological examination revealed 3/5 strength in both lower limbs. The feeling of pain decreased below the level of the umbilical cord. CT revealed an etiology similar to that before performance of the first operation (**Figure 4**). The same operation was performed but at the T10-T11 level. The patient's symptoms disappeared after the operation.

Discussion

Thoracic spinal canal stenosis is due to congenital, degenerative or endocrine and systemic disease. It can cause thoracic spinal canal volume smaller, thoracic spinal cord and nerve root compression which can lead to the corresponding clinical symptoms and signs of disease. Thoracic SCS can be divided into primary thoracic spinal stenosis and secondary thoracic spinal stenosis. Thoracic SCS has a low clinical incidence [6]. The incidence of thoracic spinal stenosis is significantly lower than cervical stenosis and lumbar spinal stenosis. The treatment and prognosis of thoracic spinal canal stenosis is different from cervical and lumbar spinal stenosis disease. This condition is caused by reduction of the thoracic spinal cross section, which can lead to compression of the spinal cord.

Thoracic SCS is unusual and complicated. It has recently been given more attention because the correct diagnosis is difficult to achieve and the clinical picture is complicated. Various factors can cause thoracic SCS, and different symptoms may develop depending on whether the spinal cord is constricted from the front or rear. Symptoms include weakness and numbness of the lower limbs, thoracoabdominal zonesthesia, back pain, a positive Babinski sign, and others. Different symptoms occur depending on the duration and extent of the compression.

Imaging examination is an important part of the diagnosis and management of thoracic SCS. CT and MR imaging are effective for the diagnosis [7]. CT can clearly reveal abnormal ossification of the soft tissue, while MR imaging can show signal changes in the spinal cord (**Figure 5**) [7, 8]. The more severe the compression of the thoracic spinal cord, the more likely the intra-

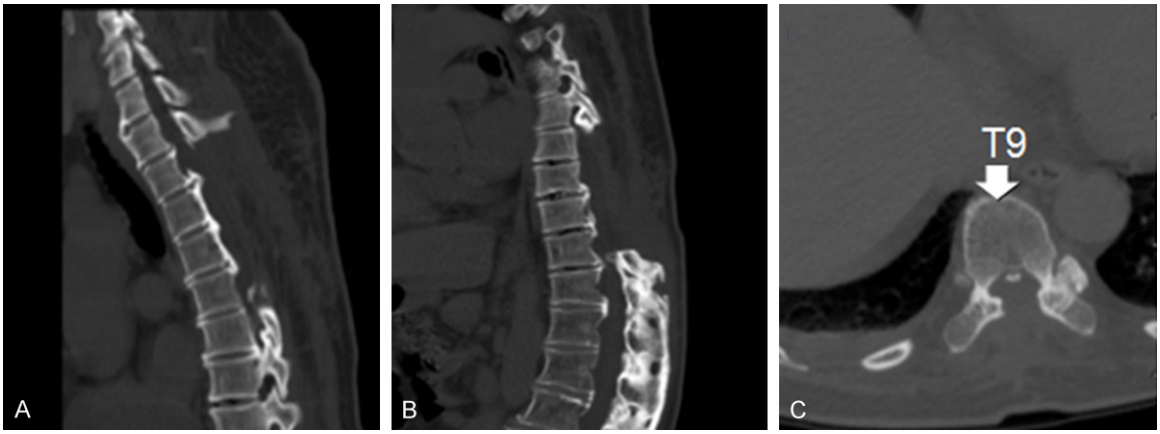

Figure 3. After the first operation, CT showing partial resection of the relative vertebral lamina of the thoracic spine. Picture A and B manifestating the vertebraes having been operated on. Picture C indicating the relieving of the rear oppression and the broadening of the thoracic spinal canal.

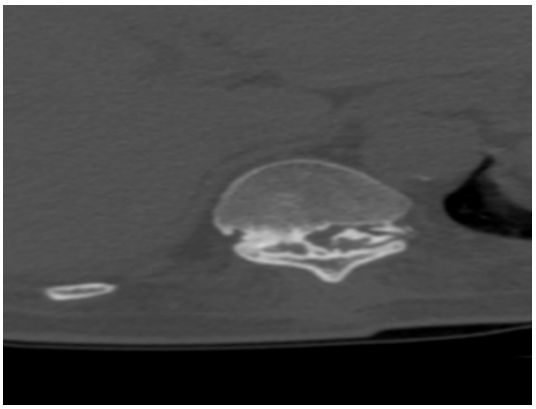

Figure 4. After the first operation, heterotopic ossification recurred at the level of the lower part of T10 and T11 (the upper part of T10 had been removed).

medullary signal intensity will be increased. The effect of nonsurgical treatment for thoracic SCS is unclear. However, surgical treatment is effective for this disease [9]. Decompression and laminectomy play an important role in the cure of thoracic SCS [10]. Complications of thoracic spinal stenosis surgery mainly include nerve injury, cerebrospinal fluid leakage, supply vascular compression of the spinal cord, epidural hematoma, etc [11, 12]. This operation can extend the thoracic spinal canal to allow for complete decompression of the spinal cord. This patient underwent the decompression and laminectomy without internal fixation. Studies have shown that the simple decompression and laminectomy has similar effect with posterior vertebral lamina and accessories resection. It also has similar effect with decompression combined with internal fixation and interbody fusion [13]. The decompression and laminectomy are a suitable operation for multiple segmental thoracic spinal canal stenosis.

Figure 5. Magnetic resonance image showed slightly increased myelic signal intensity.

Disclosure of conflict of interest

None.

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