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Case Report

A case report of acute idiopathic longitudinal extensive transverse myelitis

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ABSTRACT

Transverse myelitis is a rare disease characterized by inflammation of the spinal cord. These findings may present with findings related to primary motor neuron damage or with nonspecific findings, such as loss of muscle strength and sensation in the extremities. Herein, we presented a 21-year-old female patient with transverse myelitis with complaints of muscle weakness and urinary incontinence who was diagnosed with lumbar disc herniation after lumbar imaging and whose complaints did not improve after surgery.

Keywords: Acute transverse myelitis, extensive longitudinal, idiopathic.

Acute transverse myelitis (ATM) is an inflammation of a small segment of the spinal cord characterized by acute onset of motor, sensory, and autonomic dysfunction. Longitudinal extensive transverse myelitis (LETM) is a rare form of diffuse inflammation of the spinal cord that causes hyperintensity on T2-weighted spinal magnetic resonance imaging (MRI) and extends along three or more vertebral segments.[1] The initial findings are back pain, pain in the legs, and paresthesia. Motor disorders, such as paresis, paralysis, muscle tone changes, clonus, and spasticity, and sensory disorders, such as hyperesthesia and numbness, occur. Sphincter dysfunction, including urgency, urinary retention, or incontinence, is observed. The number of deep tendon reflexes has been found to increase.[1,2]

All diseases causing myelopathy should be considered in the differential diagnosis of ATM. Therefore, a wide spectrum should be considered in the differential diagnosis. The differential diagnosis includes vertebral compression fractures, epidural abscesses, masses, spondylitis, and compressive myelopathy caused by disc herniation and cauda equina syndrome. Although most cases are idiopathic, viral causes, such as herpes simplex virus, varicella zoster virus, cytomegalovirus, Epstein-Barr virus, human immunodeficiency virus, and severe acute respiratory syndrome coronavirus 2, and bacterial causes, such as tuberculosis and *Treponema pallidum*, can cause infectious myelopathy. In addition, various autoimmune diseases, such as multiple sclerosis, systemic lupus erythematosus, Sjögren's syndrome, and Behçet's disease, may cause secondary transverse myelitis. In such cases, the underlying causes should also be treated.[3-7]

Cord compression on MRI is among the exclusion criteria for the diagnosis of ATM.[4] However, transverse myelitis may develop in people with previous cord compression. The literature reports that there are patients with compressive myelopathy who were previously referred due to suspicion of transverse myelitis.[8]

Herein, we presented a patient who developed pain and loss of strength in the lower extremities after a lumbar disc herniation operation, who was diagnosed with unsuccessful back surgery, and who was later

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diagnosed with LETM. The study aimed to emphasize that the thoracic region should be scanned before surgery.

CASE REPORT

A 21-year-old female was admitted to the physical therapy and rehabilitation outpatient clinic. The patient had a history of dental infection and ceftriaxone treatment two months prior and laminectomy for lumbar disc herniation one month prior to admission. Approximately 10 days after the beginning of the dental infection, the patient complained of pain in the right thigh, which rapidly spread to both lower extremities, followed by progressive loss of strength in the right lower extremity, foot drop, and urinary incontinence. Lumbar MRI performed at an external center revealed diffuse bulging at the L1-2 level on T2-weighted sections, broad-based compression of the tectal sac and diffuse bulging at the L2-3 and L3-4 levels (Figure 1).

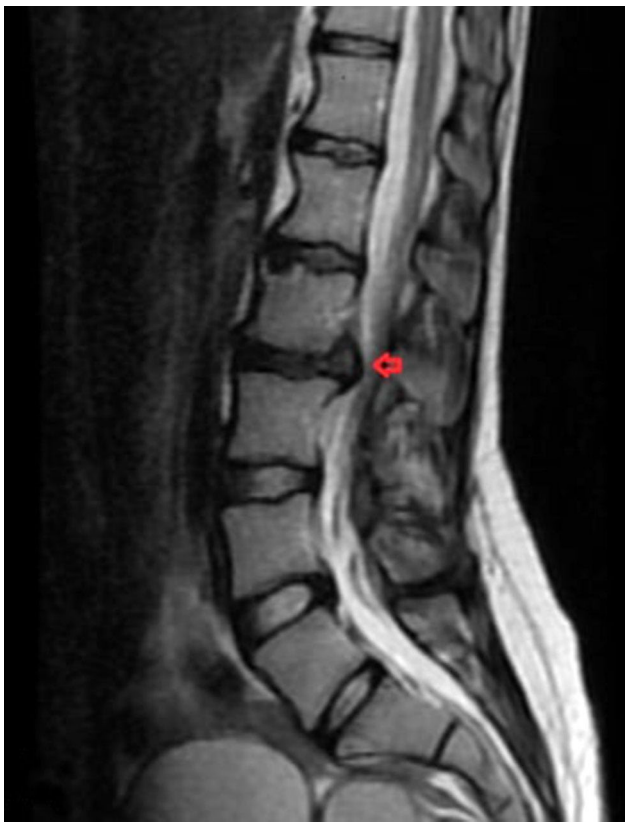

Figure 1. T2-weighted sagittal magnetic resonance imaging of the lumbar vertebral region showing root compression on the background of diffuse bulging at the L2-3 level.

The patient had some postoperative complaints after laminectomy. Among them, urinary incontinence symptoms resolved over time; however, pain in both lower extremities and weakness in the right lower extremity, as well as of foot drop, continued. Written informed consent was obtained from patient.

The patient returned to the physical medicine and rehabilitation clinic one month after the operation with complaints of pain in both lower extremities, loss of sensation, and loss of strength in the right lower extremity and lower foot. The patient was admitted to the physical therapy and rehabilitation clinic to relieve pain and improve functional status. On clinical examination, vital signs were stable, and the patient's general condition was moderate, oriented, and cooperative. The cranial nerve examination was normal. Muscle strength was complete in the upper extremities, 2/5 proximally and 1/5 distally in the right lower extremity, and 4/5 proximally and distally in the left lower extremity. Deep tendon reflexes were hyperactive bilaterally in the upper and lower extremities, and the abdominal skin reflex could not be obtained from superficial reflexes. Bilateral Babinski reflexes were positive, and clonus was detected. According to the American Spinal Injury Association Impairment Scale, the sensory level was T5, the motor level was L2, the neurological injury level was T5, and the impairment grade was D. The patient also complained of burning, numbness, tingling, and a pins-and-needles sensation; other system examination findings were normal. Neuromuscular electrical stimulation therapy was administered for dorsiflexion of the right foot. Bilateral lower extremity passive and active range of motion exercises and strengthening exercises were prescribed.

The patient was requested to be evaluated by neurosurgery and neurology departments due to pyramidal neuron findings. No pathology was observed on brain diffusion MRI, electroencephalography, or electromyography in the investigations ordered by the related departments. Brain MRI revealed several hyperintense nonspecific plaques in the subcortical area in the periventricular deep white matter in both cerebral hemispheres. Contrast-enhanced T1-weighted lumbar and sacral MRI revealed intensity changes secondary to the operation at the L2-3 level, narrowing of the spinal canal, mild compression of the conus medullaris, and protrusion of the disc and a left hemilaminectomy defect at the L3 level. As a result of these findings,

the neurology department suggested that the patient should be evaluated by the neurosurgery department regarding events secondary to the operation. However, the neurosurgery department did not consider neurosurgical intervention necessary for the patient's current condition and did not provide any additional recommendations either.

The patient history revealed that she did not have any symptoms suggestive of infection within one month after surgery. There were no findings suggestive of infection on the lumbar MRI taken after admission to our clinic. Infection is most often blamed for the pathogenesis of LETM. The patient had a history of dental infection that was diagnosed and treated by a dentist. When we evaluated laboratory findings, the dentist did not request a blood test when the patient had a dental infection (two months prior). The blood test (C-reactive protein [CRP], erythrocyte sedimentation rate [ESR], and hemogram) values of the patient at the time of spinal cord surgery (one month prior) were within normal ranges. The CRP level of the patient when she returned to the outpatient clinic was 11.47 mg/L (reference range, 0 to 5 mg/L), and the ESR was 38 mm/h (reference range, 0 to 20 mm/h). The white blood cell and lymphocyte values were within normal limits. Although the CRP and ESR values were higher than the upper limit of the reference value, they were not considered to be clinically significant for severe infection. As a result of consultation with the infectious diseases department, it was evaluated that it was unlikely that transverse myelitis would develop after a mild infection such as a dental infection, and that the patient did not have a significant infection based on laboratory and clinical history.

During hospitalization, the patient's muscle strength improved, and the right lower extremity muscle strength increased 4/5 proximally and 2/5 distally. On the twenty seventh day, lower extremity strength improved, but bilateral lower extremity muscle strength decreased to 2/5 proximally and 1/5 distally within two days. Therefore, MRI of the thoracic vertebrae, the only spinal region that had not been previously imaged, was performed. On T2-weighted axial MRI, mild expansion and diffuse hyperintensity in the medulla spinalis along the length of approximately five vertebral segments at the upper thoracic level were observed. Patchy signal changes were observed in the medulla spinalis on axial images at the middle-to-lower thoracic level (Figure 2a, b).

Intravenous pulse steroid treatment was started upon evaluation of the findings as significant in terms of LETM. Dramatic improvement was observed in the patient who received a total of 7 g of methylprednisolone in nine days. Neuropathic

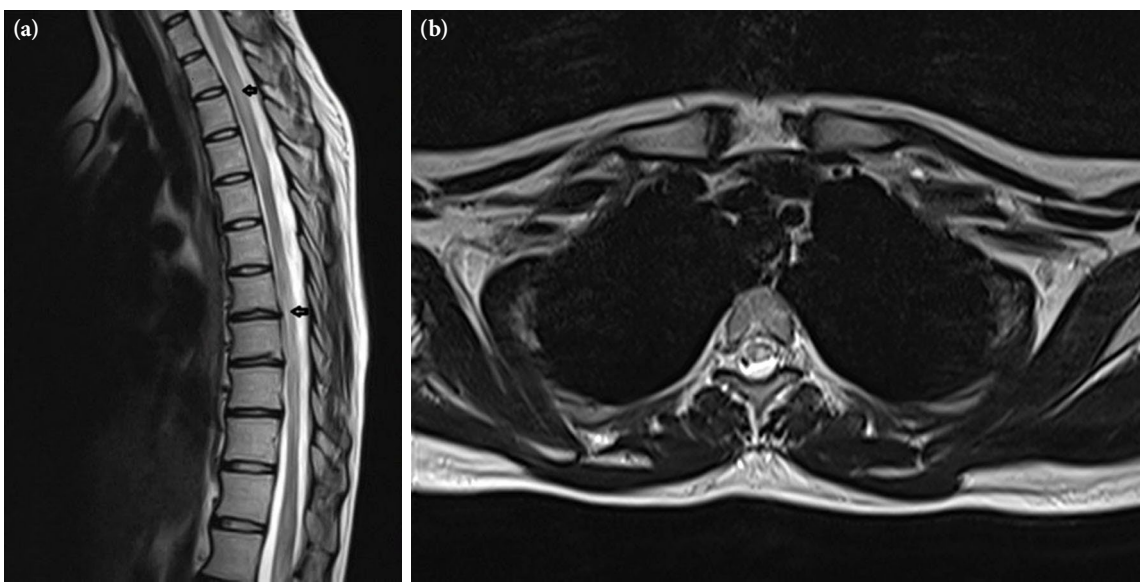

Figure 2. **(a)** Thoracic contrast-enhanced T2-weighted MRI showing a hyperintense lesion in the sagittal plane. **(b)** Patchy appearance in the medulla spinalis in the axial section on thoracic noncontrast-enhanced T2-weighted MRI.

MRI: magnetic resonance imaging.

complaints and sensory deficits decreased significantly, and muscle strength was measured as 4/5 in the bilateral lower extremities.

Vasculitis markers were used to investigate the etiology of LETM. Lumbar puncture was performed. Cerebrospinal fluid pressure, cell count, and biochemistry were normal. The patient's serum was sent to the laboratory for NMO-IgG (neuromyelitis optica-immunoglobulin G) and anti-MOG antibody detection. Thorax computed tomography was performed to investigate sarcoidosis. Angiotensin-converting enzyme levels were analyzed. The patient was investigated for systemic lupus erythematosus, Behçet's disease, and uveitis. All the results of further investigations were normal. Idiopathic LETM was diagnosed on the basis of the joint opinion of neurology, neurosurgery, and physiotherapy clinics. The patient was discharged after 40 sessions of rehabilitation treatment.

DISCUSSION

Transverse myelitis is defined as a neurological disorder characterized by focal inflammation in the spinal cord below the level of the lesion that can cause motor, sensory, and autonomic dysfunction.[9] Studies have shown that ATM is extremely rare, with an annual incidence of approximately 1 to 5 cases per million individuals.[10] The peak ages are 10 to 19 and 30 to 39 years.[10] Our patient was 21 years of age, which was close to the peak age range. Approximately 50% of patients have a previous infection.[11] The clinical presentation of ATM may be acute or subacute within 4 h to 21 days, depending on the etiology.[12] In our case, we did not encounter a case that was operated on for suspected lumbar disc herniation and later diagnosed with ATM. We believe that if surgery is considered in cases of lumbar disc herniation, the thoracic region should also be scanned. In ATM, patients may present with common nonspecific findings or various neurological symptoms; thus, the diagnosis may be delayed.[9] In this case, the patient's complaints of low back pain, weakness in the legs, and urinary incontinence were compatible with the symptoms of myelitis, but these symptoms led the physician to other more common diseases and delayed the diagnosis.

Owing to the diversity of the etiologies of ATM, it is important to determine the prognosis by making a differential diagnosis of the patient in the early period and starting appropriate treatment immediately by carefully examining the brain and lesions on MRI and in the clinic.

Magnetic resonance imaging is an important tool for the diagnosis and prognosis of ATM. Lesions are usually centrally located and have high T2 signal intensity involving gray matter and adjacent white matter.[13] As observed in our case, the lesions mostly involve the thoracic spinal segment.[14]

A multidisciplinary approach is needed for treating ATM patients. If the etiology is clearly determined, specific treatment is administered for the cause. In the medical treatment of idiopathic cases, high-dose methyl prednisolone has been reported to be beneficial.[15] In addition, planning the rehabilitation of patients is important in terms of prognosis.

In conclusion, this case report emphasizes that ATM should be considered a differential diagnosis in patients presenting with primary motor neuron findings and cauda equina syndrome. Before lumbar disc herniation operations, the thoracic region should be scanned. In addition, transverse myelitis, a rare disease, should also be considered in the differential diagnosis in patients who are considered for surgery with a diagnosis of lumbar disc herniation, particularly in patients with primary motor neuron findings, and imaging should be performed along the entire spinal cord.

Data Sharing Statement: The data that support the findings of this study are available from the corresponding author upon reasonable request.

Author Contributions: Idea/concept, control/supervision, materials: Y.P., F.B.; Data collection, analysis, literature review, writing the article, critical review: Y.P., F.B., M.Ş.

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