

# Systemic Lupus Erythematosus Presented as Extensive Longitudinal Myelitis

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## Abstract-

**Background:** longitudinal myelitis (LM) is defined by the continuous lesion of more than four spinal cord segments. LM is a rare variant of acute transverse myelitis and it frequently presented poor responses to immunomodulatory therapy, which resulted in severe and disabling sequelae. We reported a case of acute longitudinal myelitis involving extensive lesions from cervical spinal cord to conus medullaris caused by newly diagnosed SLE.

**Case Report:** A 39 years old man who was previously healthy presented to our hospital due to acute urinary retention with progressive lower limb weakness for a week. Brisk deep tendon reflexes in upper limbs and decreased reflexes in lower limbs were noted on admission. The pin-prick, vibration, and light touch sensations were decreased in the lower limbs. Spinal MRI sagittal view showed an T2WI bright up mass in the spinal cord below C3/4 level with extension to conus medullaris. He was diagnosed SLE based on ARA criteria. After ruling out mimics including NMO and MS, SLE with LM explained what happened to him.

**Conclusion:** Given the poor prognosis of SLE with LM, which resulted in severe and disabling sequelae. More comprehensive understand of the disease course, real mechanisms and treatment strategy are needed.

**Key Words:** Systemic Lupus Erythematosus, Longitudinal Myelitis, Acute transverse myelitis

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## INTRODUCTION

Systemic lupus erythematosus (SLE) is a systemic autoimmune disease with multiple organ involvement. Among SLE patients, central nervous system involvement is reported to be 24% to 51%<sup>(1)</sup>. Common neurological manifestations are seizure, psychosis, cere-

brovascular disease, cognitive dysfunction, aseptic meningitis, and headache<sup>(2,3)</sup>. Acute transverse myelitis (ATM) presents as a rapidly progressive motor, sensory and autonomic dysfunction is less common and could be found in 1-2% SLE patients<sup>(4,6-10)</sup>. A even rarer variant is longitudinal myelitis (LM), which is defined by the continuous lesion of more than four spinal cord segments.

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characterized by acute catastrophic onset and poor outcome. The pathogenesis of LM is unclear; the optimal management strategy is still uncertain<sup>(11-13)</sup>. Here, we describe a patient presenting with LM as the first manifestation of SLE.

## CASE REPORT

### Patient history

A 39-year-old man who was previously healthy presented to our hospital due to acute urinary retention. He had fever up to 39°C for one week accompanied by multiple joint pain. Progressive lower limb weakness was also noted for a week. Upon admission, he could not lift his legs from the bed. Brisk deep tendon reflexes in upper limbs and decreased reflexes in lower limbs were noted. The pin-prick, vibration, and light touch sensations were decreased in the lower limbs.

### Image study

Spinal MRI sagittal view showed an T2WI bright up mass in the spinal cord below C3/4 level with extension to conus medullaris (Figure 1.). T2 weighted axial view showed intramedullary bright up lesion, involving mainly central part with sparing peripheral spinal cord (figure 2.). Brain MRI with contrast showed no obvious abnormality of the visualized brain parenchyma and intracranial arteries.

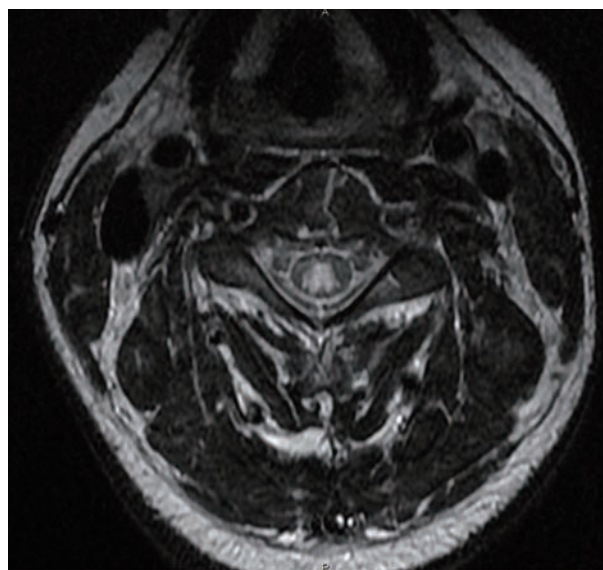


**Figure 1.** T2 Fast Relaxation Fast Spin Echo sequence MRI in the sagittal view shows T2WI bright up mass in the spinal cord below C3/4 level with extension to conus medullaris

### Laboratory work-up

Blood tests including electrolytes, renal, liver and thyroid function, creatine kinase, glucose, vitamin B12, folic acid, prothrombin time and activated partial prothrombin time were all within normal range. Abnormal data included hemoglobin level: 10.3 g/dL (normal range 14.0-18.0 g/dL), platelet count:  $160 \times 10^3$  /uL (normal range  $130-400 \times 10^3$  /uL), white blood cell count:  $3.70 \times 10^3$ /uL (normal range  $4.80-10.80 \times 10^3$ /uL) ESR: 98 mm/1hr (normal range 0-10.) .

Rheumatologic blood tests showed highly positive antinuclear antibodies (1:640X) Cytoplasmic pattern; high levels of anti-dsDNA antibodies ( $>400.00$  IU/mL, normal range  $<10$  IU/mL); serum complement C3 and C4 levels were reduced (C3 = 28.5 mg/dL, normal range 90-180 mg/dL; C4 = 5.7 mg/dl, normal range 10-40 mg/dl); ENA (SSA, SSB) were negative; aPL: 1.12 RU/mL was normal but anticardiolipin antibodies was low to medium Positive, GPL: 28.40. A lumbar puncture revealed elevated white cells count: 104 /uL with an elevated protein level of 173.0 mg/dL (normal range: 15-45 mg/dL). Glucose levels was low: 32 mg/dL (serum glucose: 121 mg/dL) No oligoclonal pattern in serum and cerebrospinal fluid (CSF) suggesting no intrathecal synthesis. IgG index: 1 (normal range  $< 0.70$ ); HIV, HSV,



**Figure 2.** axial T2 weighted view showed intramedullary bright up lesion, involving mainly central part with sparing peripheral spinal cord

Adenovirus serology tests and Anti-Aquaporin-4 Antibody were negative.

### Clinical course

Rheumatology consultation confirmed the diagnosis of SLE. After admission, the patient had rapid progression of lower limbs weakness. His muscle power dropped to MRC grade 0 on the second day; all sensory modalities were lost below the level of T6, too. Treatments with steroid pulse therapy (1000 mg of methylprednisolone intravenously per day for continuous five days) were given but they did not improve the neurological deficits. Five sessions of plasmapheresis on alternate days were then performed and he received regular rehabilitation programs. However, after follow-up for a month, the patient still had flaccid lower limbs; micturition difficulty and sensory impairment persisted. He still necessitated intermittent catheterization.

## DISCUSSION

### 1. The diagnosis:

Our patient was diagnosed SLE based on arthritis, hematological disorder: leukopenia (less than  $4000/\text{mm}^3$  total on two or more occasions), positive antinuclear and anti-dsDNA antibodies (ARA criteria for diagnosis of systemic lupus erythematosus). His extensive spinal cord lesion from C3/4 level to conus medullaris could be compatible with LM (inflammatory changes involving spinal cord sections of more than 4-segment length.).

### 2. LM in SLE:

In 1999, Deodhar and coworkers<sup>(11)</sup> reported the first case of LM in SLE patients. In 2001, Tellez-Zenteno and collaborators<sup>(12)</sup> presented the first series of six patient with SLE-related LM. In 2010, Espinosa et al.<sup>(14)</sup> reviewed 22 cases of myelitis affecting more than 4 spinal segments. Another two case<sup>(15,16)</sup> were reported in 2010 and 2011, including one paediatric case. With our patient, there were total 25 reported cases of SLE-related LM in the literature. Among them, 19 were females (76%) and the mean age at diagnosis of LM was  $30.4 \pm 12$  years (range, 12-65 years). LM was the first manifes-

tation of SLE in 7 cases. Hypothesized pathogenic mechanism of LM included vasculitis, white matter degeneration, and ischemic cord necrosis<sup>(13-15)</sup>. The role of hypercoagulability from aPL has drawn clinical attention. Previous study found that 50% of SLE patients were tested positive for aPL<sup>(15)</sup>. The prevalence is higher than those of SLE without myelitis. Thrombosis of spinal arteries related to the presence of aPL may be postulated as a pathogenic etiology of LM related to SLE. Interestingly, Marco et al.<sup>(14)</sup> has reported a case of SLE-related LM with favorable outcome, whose aPL and anticardiolipin antibodies were all tested negative. They speculated that the lacking of aPL may represent an index of favorable prognosis.

### 3. Differential diagnosis with MS, NMO

Based on Revised McDonald Criteria, diagnosis of multiple sclerosis could not be satisfied. JL Kitley suggested that SLE patients with myelitis should be tested for AQP4 antibodies, as their presence may influence treatment decisions<sup>(19-20)</sup>. According to Weinshenker BG et al., not any distinguishing features between LETM in patients who are seropositive for NMO-IgG and those who are seronegative, with no differences in sex, age at onset, ethnicity, length or location of spinal cord lesion, abnormalities on brain MRI, cerebrospinal fluid (CSF) findings or clinical severity. Therefore, our patient also accepted test for Anti-Aquaporin-4 Antibody. The test result was negative.

### 4. Treatment of SLE-related LM

Intravenous pulses of methylprednisolone (500-1000 mg/d for 2-5 days) was considered first-line therapy and had been used in 86% patients<sup>(15)</sup>. Other therapies including immunosuppressant such as cyclophosphamide, azathioprine, plasma exchange/ plasmapheresis, rituximab, and intravenous immunoglobulins (IVIG) were also been reported, mostly in combination. The most commonly used combination therapy was corticosteroid with cyclophosphamide, which was prescribed in 45% patients<sup>(15)</sup>. Considering the possible thrombotic etiology of those patients, antiplatelet was used in 18% patients, and anticoagulants in 18% patients. Despite the prompt

treatment, only 14% patients had complete resolution of symptoms; most patient still came out unresponsive to therapies (27%) or with only partial improvement (59%). Téllez-Zenteno et al.<sup>(12)</sup> have commented that the outcome can be unfavorable in most cases even with aggressive treatment. In the case with favorable outcome described by Marco et al.<sup>(14)</sup>. They speculated that early aggressive treatment, by combination of plasmapheresis and immunosuppressive agents, may be related to more favorable outcome and should be considered in patients with LM. In the report of Espinosa et al.<sup>(15)</sup>, 6 of 22 patients of their series received plasmapheresis, in various combination with other therapies, 2 (33.3%) had complete improvement, and 2 (33.3%) had partial improvement. The remission rate was higher than the patient receiving no plasmapheresis (1 of 16 patients, 6.3% respectively), revealing that plasmapheresis or plasma exchange may play a role in treatment of SLE-related LM. However, the benefit was not shown in our patient. Better strategies of treatment, in combination of immunomodulators, plasmapheresis, and anti-thrombotic agents, should be further evaluated in the specific group of these patients.

## CONCLUSION

We reported a case of acute longitudinal myelitis involving extensive lesions from cervical spinal cord to conus medullaris caused by newly diagnosed SLE. LM is a rare variant of acute transverse myelitis and it frequently presented poor responses to immunomodulatory therapy, which resulted in severe and disabling sequelae. More comprehensive understand of the disease course, real mechanisms and treatment strategy are needed.

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