non-verbal IQ was 94, her verbal IQ was 87 and her global IQ was 90. Her cognitive impairment gradually decreased. One year later, brain MRI (Fig. 1C and D) showed improvement in the right paralateral ventricle.

The classification of NPSLE has been used to verify the clinical manifestations [1]. Her neuropsychiatric manifestations were cerebrovascular disease, headache, tremors and cognitive dysfunction. The pathogenesis of NPSLE remains unclear. The present case showed vascular abnormalities, aPLs and elevation in CSF IL-6. Previous studies have shown associations between increased serum levels of IL-6 and learning deficits in SLE [2, 3]. Horai et al. [4] have shown that the CSF IL-6 levels are useful in the diagnosis of NPSLE.

Recently the N-methyl-D-aspartate (NMDA) receptor subunit NR2 was shown to be a target of autoantibodies in SLE, supporting the notion of the antigenic target hypothesis as a mechanism of NP manifestations [5–8]. The NR2 receptors are expressed on neurons in the hippocampus and cortex, and bind the excitatory amino acid neurotransmitter glutamate. These receptors have been postulated to be important in mechanisms underlying learning and memory. Anti-NR2 antibodies may be produced only outside the CNS and enter the CSF as a result of damage to the blood-brain barrier. Arinuma et al. [6] showed that elevated levels of anti-NR2 antibodies in the CSF occurred frequently in the patients with diffuse NPSLE. Yoshio et al. [5] found an association between NP symptoms and CSF anti-NR2 antibodies compared with circulating anti-NR2 antibodies. Further, they described that steroid therapy may improve the damage to the blood-brain barrier and decrease the level of anti-NR2 antibodies entering the CSF. Anti-NR2 antibodies function as NMDA receptor agonists [7, 8]. IL-6 synthesis in neurons is dependent on activation of the NR2B subunit [9].

In conclusion, no gold standard diagnostic tests for NPSLE are available at present. The findings in the present case indicate that CSF anti-NR2 glutamate receptor antibodies and IL-6 levels may be associated with pathogenesis, and they might be useful as markers of NPSLE activity.

**Rheumatology key message**

- CSF anti-NR2 antibodies and IL-6 are useful in both diagnosis and activity of NPSLE.

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**References**


2 Alcocer-Varela J, Aleman-Hoey D, Alancon-Segovia D. Interleukin-1 and interleukin-6 activities are increased in the cerebrospinal fluid of patients with CNS lupus erythematosus and correlate with local late T-cell activation markers. Lupus 1992;1:111–7.


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Lumbar canal spinal stenosis due to axial skeletal calcinosis and heterotopic ossification in limited cutaneous systemic sclerosis: successful spinal decompression

Sir, Peripheral cutaneous calcinosis is well recognized in lcSSc, but axial skeletal calcinosis is less common [1]. Heterotopic ossification of the spine has not been reported to occur in SSc. We present a case of lcSSc with lumbar canal spinal stenosis due to calcinosis and heterotopic ossification that had successful decompressive spinal surgery.

A 60-year-old lady with lcSSc of 12 years duration presented with low back pain radiating down her left leg of 6 months duration. Pain was worsened by prolonged standing or activities that involved extension of the spine. Her walking distance was limited by exacerbation of back
pain and heaviness and aching pain in both legs. She had no paraesthesia or numbness in her legs and had not noticed any recent changes in bowel and bladder control.

The lcSSc was manifest by marked RP involving hands and feet, reflux oesophagitis, dysphagia to solids and occasional faecal incontinence, sclerodactyly, digital calcinosis and pitting, axial calcinosis (right shoulder and anterior right hip periarticular masses), telangiectasias, microstomia, nail changes, positive ANA with specificity for centromere on IF, but no evidence for antibodies to anti-Scl-70 or U1snRNP, RNP 70, Sm, SSA-Ro, SSB-La or Jo-1. She had chronic kidney disease Stage 3a from estimated glomerular filtration rate (e-GFR) of 51 and was taking diltiazem regularly in an attempt to reduce further calcinosis [2]. Corrected serum calcium was 2.37 mmol/l, serum phosphate 1.41 mmol/l and calcium × phosphate product 3.34. PTH was 6.1 pmol/l (range 1-4.5 pmol/l) and 25-hydroxyvitamin D (25OHD) was 18.9 nmol/l (insufficiency range <75 nmol/l; deficiency range <25 nmol/l). On examination, no neurological signs were obvious on her legs. Peripheral pulses were symmetrical and normal.

Anteroposterior and lateral radiographs of the lumbar spine suggested calcific deposits in lumbar canal. MRI of the lumbar spine disclosed features suggestive of lumbar canal spinal stenosis showing a large soft-tissue mass adjacent to, and possibly contiguous with, the left L4/L5 facet joint (Fig. 1). At spinal surgery, a mass adherent to thickened dura was found deep to ligamentum flavum at the level of L4/L5 and was removed. Following surgery, her back and leg pain was relieved. She was able to mobilize virtually without pain within a few weeks. Now, 12 months after the operation, she has no neurogenic leg or claudication-type symptoms. Histopathological analysis of excised tissue suggested a fibrous connective tissue mass with foci of calcinosis and some evidence of heterotopic ossification. Calcification was confirmed by von Kossa stain (data not shown).

This case illustrates both calcinosis and heterotopic ossification contributing to a soft-tissue stenotic lesion in the lumbar spinal canal causing spinal stenosis in a patient with lcSSc. A computer-based literature review on MEDLINE, PubMed and Embase revealed only one case report of heterotopic ossification occurring in SSc and this did not involve spinal or paraspinal lesions [3]. The pathophysiology of calcinosis in SSc patients is unclear, although it is thought to be a consequence of vascular complications of SSc [4]. The treatment of calcinosis is difficult and many treatment modalities have been tried with limited success [4]. There are reports of reduction in calcinosis with use of diltiazem [2, 5, 6]. However, our patient developed severe axial calcinosis, despite being on diltiazem. The pathogenesis of heterotopic ossification—formation of bone in extraskeletal sites—is not clearly known [7]. There are no known effective

![Fig. 1](image-url) Left-hand panel shows a T2-weighted mid-sagittal MRI showing site of canal stenosis at L4/L5 (→). On the right (both T2-weighted axial images), the upper image clearly shows a reasonably patent spinal canal at the L3/L4 level, but the lower image (L4/L5 level) shows obliteration of the spinal canal by soft tissue.
medications to reduce or prevent these mass lesions in SSc patients, thus surgery remains the only therapeutic option if there are compressive or other structural effects.

The case illustrates that when evaluating back and leg pain and neurogenic symptoms in patients with SSc, the possibility of soft-tissue calcification and ossification contributing to spinal stenosis should be considered. In addition, it is important to note that a highly successful outcome from spinal canal decompressive surgery can be achieved (at least in the short mid-term). The patient remains under long-term rheumatological follow-up.

**Rheumatology key message**
- Soft-tissue calcification and ossification can cause spinal stenosis in SSc.

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**References**


