Case report

Tetraplegia as a presenting feature of systemic lupus erythematosus complicated by pulmonary hypertension

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SUMMARY A 28-year-old woman presenting with subacute onset of a tetraplegia is described who was shown to have active systemic lupus erythematosus in association with high circulating anticardiolipin binding and lupus anticoagulant activity. The patient later developed severe symptomatic systemic and pulmonary hypertension and required emergency resuscitation. This case provides further support for an association between antiphospholipid antibodies and the clinical features of central nervous system (CNS) involvement and pulmonary hypertension in SLE.

Key words: CNS lupus, antiphospholipid antibodies, pulmonary hypertension.

Involvement of the central nervous system in systemic lupus erythematosus (SLE) may be a major problem in terms of management and prognosis, though it is very seldom a presenting feature of the condition. An association has been described between the 'lupus anticoagulant', circulating antibodies directed against phospholipid antigens, particularly cardiolipin, and recurrent arterial and venous thromboses including cerebral thromboses.¹ In view of the recent report of a further possible association of lupus anticoagulant activity and pulmonary hypertension² we describe a patient who presented with a tetraplegia and was found to have active SLE with high anticardiolipin binding and lupus anticoagulant activity, who developed pulmonary hypertension.

Case report

A 28-year-old Egyptian female was admitted to hospital in Alexandria in August 1978 with a fever of 38°C and a left hemiparesis which developed over a few hours and reached a maximum over the follow-

ing week. The hemiparesis gradually improved, and she was discharged after a further two weeks.

In July 1980 she sought the opinion of a London neurologist, who found a marked spastic left hemiparesis with involvement of the face on the left side together with pathological right-sided hyperreflexia and bilateral extensor plantar responses. There was no other cranial nerve abnormality and no sensory deficit. A computerised tomographic scan of the brain was normal, and a tentative diagnosis of encephalitis in 1978 was made. She returned to Egypt walking unaided but with a spastic gait; there was no functional disability in her upper limbs.

In August 1984 while visiting relatives in London she developed fever, generalised weakness, and urinary incontinence over a few days. Examination revealed an asymmetrical spastic tetraparesis, more on the left than the right, with bilateral sustained ankle clonus and extensor plantars. Cranial nerves were normal, and there was no sensory deficit. A fever of 38.4°C, sinus tachycardia of 120 per minute, blood pressure 150/120 mmHg, and a mid-systolic murmur at the cardiac apex were noted. Patchy discoloration of the skin over both calves was also present.

Investigations on admission included: Hb 10.1 g/dl; leucocytes $6.0 \times 10^9/l$; platelets $276 \times 10^9/l$; erythrocyte sedimentation rate 130 mm/h; prothrombin ratio 14/11 s; partial thromboplastin-kaolin time 50 s with a control time of 30 s, which did not correct on mixing with normal plasma (indicating that a lupus anticoagulant was present); thrombin time 13/11.5 s; blood cultures negative; urea 3.2 mmol/l; creatinine 58 $\mu\text{mol/l}$; albumin 31 g/l; globulin 47 g/l with raised IgG 24.8 g/l (normal 8–18 g/l), normal IgA and IgM, no monoclonal band; normal liver enzymes and thyroxine; 24-hour urinary protein excretion was 0.22 g, 0.54 g, 1.80 g, 6.48 g on consecutive weekly collections.

Positive antinuclear antibody (ANA) titre 1/2560, homogeneous pattern (rat liver substrate); positive immunofluorescence on human epithelial cells (HEp₂) > 1:640; positive immunofluorescent antibody to double-stranded deoxyribonucleic acid 1:40 with *Crithidia luciliae*; anti-DNA assay 141 U/ml (normal <25 U/ml; Amersham kit – Amersham International, Bucks.); negative direct Coombs' test, rapid plasma reagin test and *Treponema pallidum* haemagglutination test; serum C-reactive protein 189 mg/l (normal <12 mg/l); polyethylene glycol precipitable immune complexes 50–80 mg/l (normal <100 mg/l; anticardiolipin antibodies measured by ELISA assay:³ IgM 66% (normal <15), IgG 8.3% (normal <5).

Cervical myelography was normal, with cerebrospinal fluid (CSF) protein 1.0 g/l. Computerised tomographic brain scan showed dilation of the ventricular system. Echocardiography showed left ventricular hypertrophy without evidence of valvular vegetations.

The patient was treated with bolus methylprednisolone therapy, 1 g per day for two days, and then oral prednisolone 40 mg/day. The hypertension initially settled without specific treatment. Over the next three weeks the platelet count gradually dropped to $45 \times 10^9/l$ and then recovered to the initial level at presentation. Four weeks after admission she became acutely unwell with clinical evidence of poor cardiac output, tricuspid regurgitation, systemic and pulmonary hypertension, but neither pulmonary nor peripheral oedema. Auscultation revealed a gallop rhythm, accentuated pulmonary second heart sound, and a loud systolic murmur radiating to the axilla. At one stage the blood pressure rose to 190/150 mmHg and required treatment with intravenous diazoxide, when the mean central venous pressure was 25 cm of water (20 mmHg). Chest x-ray showed an enlarged heart but clear lung fields. About an hour later when the blood pressure had fallen to 150/100 mmHg, a Swan-Ganz catheter gave the following readings

(mmHg): mean central venous pressure 1, right ventricle 60/7, pulmonary artery 60/23, mean pulmonary artery wedge pressure 6. Diagnoses were made of 'functional' tricuspid and mitral regurgitation secondary to increased vascular resistance.

The hypertension was subsequently well controlled with nifedipine, though proteinuria had increased to 6.5 g/day, and azathioprine was added to the steroid therapy. There has been no significant recovery of the neurological deficit three months after its onset.

Discussion

Neuropsychiatric manifestations of systemic lupus are common, reported in 37%⁴ and 59%⁵ of two large series. The commonest features are psychiatric illness and seizures, but about 10% of patients may have evidence of pyramidal tract lesions (usually attributed to a 'cerebrovascular accident'), and rare cases of transverse myelopathy have been described.^{6,7} However, neurological presentation is very rare.⁸ In one series⁵ 3% of patients with SLE presented with seizures, but all other neuropsychiatric features developed later in the course of their disease. Fulford *et al.*⁹ reported five women with slowly progressive spastic paraplegia resembling multiple sclerosis, in whom weakly positive antinuclear antibodies were detected. They proposed the term 'lupoid sclerosis' and also reviewed the few other published accounts of SLE patients with neurological disturbance at presentation.

In our patient the first manifestation of SLE may have been the initial left hemiparesis in 1978, and by 1980 bilateral pyramidal tract lesions were present without any evidence of haemorrhage or infarct on computerised tomography (CT) of the brain. A spastic tetraplegia of subacute onset later developed with unequivocal active SLE, as shown by the accompanying positive ANA, strongly positive anti-DNA antibodies, proteinuria, and thrombocytopenia. The CSF protein concentration was also raised, though cervical myelography and repeat CT brain scan failed to show a structural lesion.

The pathogenesis of cerebral and spinal cord lesions is uncertain and probably multifactorial. Vasculitis, non-inflammatory microvascular lesions, and brain-reactive antibodies have all been invoked.¹⁰ More recently an association of central nervous system involvement with multiple cerebral, deep venous, and other thromboses has been recognised in those patients who possess a circulating antibody known as the 'lupus anticoagulant'.¹¹

The lupus anticoagulant, found in up to one quarter of patients with SLE, prolongs the partial thromboplastin-kaolin time in vitro, yet paradox

ically is associated with a hypercoagulable state and with an increased risk of thrombocytopenia and spontaneous abortion. Furthermore, pulmonary hypertension has recently been described in six SLE patients without parenchymal lung disease or overt pulmonary embolism, five of whom possessed lupus anticoagulant activity, and intrapulmonary microthrombosis has been postulated.²

It has been known for many years that those patients with biological false positive Wassermann reactions had a high incidence of the lupus anticoagulant. It is now believed that the former phenomenon is due to the presence of a circulating antibody directed against cardiolipin, a phospholipid constituent of cell membranes, and that the lupus anticoagulant is also an antiphospholipid antibody. Harris and colleagues¹² have shown a significant correlation between the degree of increase of IgG anticardiolipin antibody level and the degree of positivity of the lupus anticoagulant. High titres of anticardiolipin antibodies are apparently also associated with venous and cerebral thromboses.¹³

The mechanism of CNS lesions in SLE may then be linked with the presence of this family of antibodies. In addition to causing disturbances of microcirculation it is possible that these antibodies may cross react with complex brain phospholipids such as sphingomyelin. The present case provides further support for an association between these antilipid antibodies and the clinical features of CNS involvement and pulmonary hypertension in SLE.

this case, and Dr B Colaco of the Middlesex Hospital for measuring anticardiolipin antibody levels.

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