Ward Round: A patient with blurred vision and leg weakness

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An 18-year-old woman, who was 36 weeks pregnant, came to the Obstetrics department because of poor vision and leg weakness. Her eyesight had gradually worsened over the previous month until by the time of admission her visual acuity was limited to finger counting. She was complaining of a retro-orbital and generalised headache, which was worse in the evenings. A fortnight before admission she had developed numbness and prickling discomfort of her toes which gradually spread proximally to her feet and legs, and eventually to a numb sensation around her waist. At the onset of her illness she had felt unsteady, and started to fall. Her legs became progressively weaker until she was unable to leave her bed by the time she arrived at hospital. Passing urine had become difficult, though she was not incontinent. She had no history of fever, weight loss or diarrhoea though she had had occasional night sweats and complained of mild low back pain.

Three days later she delivered a healthy girl by vacuum extraction. She was admitted to the intensive care unit for observation.

On examination her vision was so poor she was only able to see hand movements. Both her pupils were large and slowly reactive to bright light. Fundoscopy was normal. Examination of her arms and face was normal. She was unable to move her legs, nor sit unaided and all lower limb reflexes were absent. Light touch, proprioception and pinprick sensation were absent over her legs and trunk up to a sensory level beneath her breasts. Other than fever, a general medical examination was normal. Her episiotomy wound appeared to be infected.

Plain radiographs of her chest and thoracic and lumbar spine were normal. An HIV ELISA rapid spot test was positive and a VDRL test was negative. A blood film revealed 2+ *Plasmodium falciparum*. Cerebrospinal fluid examination revealed a total white cell count of 7 cells/mm3 and protein of 2+ on dipstick.

Her fever resolved with penicillin, gentamicin, metronidazole and quinine. She was treated with 40 mg prednisolone for 1 week with pressure area care and physiotherapy. After one month, she had made a full recovery and was discharged from hospital.

What diagnosis would you consider in this young woman with reversible paraplegia and visual impairment?

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Diagnosis

The clinical features of this case are characteristic of neuromyelitis optica, or Devic's disease. The condition was first described by Eugène Devic (Devic 1894) as a catastrophic multiphasic illness with bilateral optic neuritis closely followed by a severe transverse myelitis. Investigations that support the diagnosis are CSF pleiocytosis, normal brain magnetic resonance imaging (MRI) and abnormal spinal cord MRI with high signal extending over more than 3 spinal segments. Both the transverse myelitis and optic neuritis in neuromyelitis optica are severe and do not usually recover completely – half of patients are unable to walk or are blind in one eye 5 years after disease onset.

Whilst there is a differential diagnosis for patients with bilateral optic neuritis and transverse myelitis, we believe these are less likely than neuromyelitis optica in our patient; sarcoidosis of the nervous system is usually associated with an abnormal chest radiograph and a CSF lymphocytosis, the findings in subacute combined degeneration of the cord are of impaired dorsal column sensory loss with preserved spinothalamic sensation, and primary central nervous system lymphoma is usually progressive despite treatment with steroids. Whilst opportunistic infections in HIV infection can produce various neurological presentations, this woman's illness is unusual for any of them – although transverse myelitis can be caused by HIV itself, syphilis, cytomegalovirus, varicella zoster virus and tuberculosis, in these cases it is usually associated with a more extensive CSF pleiocytosis, and synchronous optic neuritis is only rarely reported. There are a number of case reports of people with otherwise typical neuromyelitis optica occurring in the context of systemic lupus erythematosus (Bonnet 1999), but other than fever, explained here by malaria, she had no features to suggest a multisystem disorder.

We were not able to perform the tests required to exclude these diagnoses.

Neuromyelitis optica vs multiple sclerosis

Both neuromyelitis optica and multiple sclerosis are demyelinating diseases of the central nervous system – neuromyelitis optica tends to be non-recurrent, although it can have a relapsing course, and multiple sclerosis is usually relapsing and remitting although it can be progressive from onset. The precise nature of the relationship between the two diseases is not certain, but it is becoming clear that they are distinct, closely related conditions. Both diseases result in central nervous system demyelination, though lesions in neuromyelitis optica are more necrotic with a vasculocentric pattern of complement activation implying a pathogenic autoantibody. Such an antibody has been identified in patients with neuromyelitis optica that co-localises with laminin and binds to spinal cord (Weinshenker 2003). Excitingly, plasmapheresis – removing the putative antibody - shows promise as a treatment for patients with neuromyelitis optica (Cox 2005).

Neuromyelitis optica is said to be commoner than multiple sclerosis in populations with an African origin. There are a number of case reports from Southern Africa with the clinical phenotype of neuromyelitis optica, but only very few cases of multiple sclerosis (Modi 2000). However, there have been no population based studies of the frequencies of both diseases in Africa, and there is very likely significant underascertainment of the frequency of both multiple sclerosis and neuromyelitis optica. Martinique in the West Indies was thought to be an area of low risk for central nervous system demyelinating diseases until a population based study found the prevalence to be 17.4/100,000, similar to other areas with a medium risk for the disease. In this study, neuromyelitis optica was found only in patients with African ancestry, though the majority of patients of both African and European ancestry had multiple sclerosis (Cabre 2000). A non-population based study in the USA found a higher proportion of neuromyelitis optica in African American (17%) than in Caucasian American (8%) patients presenting with a demyelinating illness, but the sampling of patients in this study makes it difficult to interpret (Cree 2004).

There are a handful of case reports of patients with HIV developing a central nervous system demyelinating disorder, some of which describe a relapsing disorder like multiple sclerosis, and one of which describes a woman of African origin who developed neuromyelitis optica (Blanche 2000). However, developing multiple sclerosis or neuromyelitis optica in HIV infection seems to be uncommon and no causal link between the two has been established.

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