

Copper Deficiency Masquerading as Subacute Combined Degeneration of the Cord and Myelodysplastic Syndrome

Copper deficiency is an increasingly reported but under-recognised cause of blood dyscrasias and neurological dysfunction. It can present to the neurologist as a myeloneuropathy that resembles subacute combined degeneration of the cord both clinically and radiologically. We describe a patient who presented initially to the haematologists with a myelodysplastic syndrome but went on to develop a myeloneuropathy triggering the recognition of copper deficiency as the unifying diagnosis. Copper supplementation completely reversed the haematological disorder and stopped his neurological deterioration.

Case report

A 69-year-old retired clergyman, who had undergone a partial gastrectomy for a duodenal ulcer in the 1960s, presented in late 2004 to his GP with fatigue. He was found to have a normocytic anaemia (Hb 7.7g/dl, MCV 88.5fl) and leukopenia (white cell count $1.1 \times 10^9/l$) in the presence of a normal platelet count and normal B12, folate and ferritin levels. He was referred to the haematologists at his local hospital where a bone marrow biopsy showed dyserythropoiesis with vacuolated erythroid precursors, left shift of granulopoiesis, and normal megakaryocytes. Perl's stain demonstrated normal iron stores and ring sideroblasts. A diagnosis of myelodysplastic syndrome was made.

He was managed supportively over the next 18 months with recurrent red cell transfusions, as required. His white cell count remained low, with neutrophils never exceeding $0.9 \times 10^9/l$ (Figure 1).

He was first seen by neurology 12 months after initial assessment having complained of ascending numbness. Examination revealed a mild spastic paraparesis with brisk lower limb reflexes, bilaterally upgoing plantars and a soft sensory level at T11. He was fully ambulant. A compressive spinal cord syndrome was initially suspected. MRI of his spine was unremarkable and, apart from his known haematological abnormalities, all investigations were normal including repeated B12 and folate levels, autoantibody screen, antineutrophil cytoplasmic

antibodies, antineuronal antibodies and serology for syphilis and human T-cell lymphoma viruses. CSF was acellular with a protein of 0.4g/l and no detectable oligoclonal bands.

Further neurological deterioration occurred over the next 6 months. By this time, the patient's numbness had ascended to the level of the mid-chest and to the elbows. He complained of feeling increasingly unsteady on his feet, and was having frequent falls, particularly at night. He was only able to mobilise a few steps with assistance. His sphincter function remained normal.

On examination, tone in the upper limbs was normal. In the lower limbs, tone was markedly increased with sustained clonus at both ankles. There was mild power loss (MRC 4- to 4) in all limbs in a pyramidal distribution.

Upper limb reflexes were diminished, while lower limb reflexes were pathologically brisk with bilateral extensor plantars. Sensation to light touch and pin prick was diminished up to the waist, with a flank-sparing extension to a level of T5, and in a glove pattern up to the elbows. Vibration sense was absent to the sternum. Proprioception was markedly impaired to the proximal interphalangeal joints in the upper limbs, and to the ankles in the lower limbs. There was pseudoathetosis and sensory ataxia. He was able to stand only with support.

The patient was admitted to the regional neurosciences centre for further investigation. Haemoglobin and white cell count remained low, though the red cells were now macrocytic (MCV 103fl). B12 and folate levels were again normal. ESR was 74. CSF was acellular but contained mildly high protein levels at 0.53g/l. Nerve conduction studies showed normal amplitudes, conduction velocities and distal latencies. MRI brain was normal, however MRI of the spinal cord now showed a longitudinally extensive high T2 signal lesion in the dorsal cord (Figure 2).

The clinical and radiological findings were reminiscent of subacute combined degeneration of the cord, and although B12 levels had been repeatedly normal, functional B12 deficiency was considered possible and



Dr Stephan R Jaiser graduated MA, MB, BChir (2002), from Cambridge University. Early medical training at Addenbrooke's Hospital, Cambridge and Queen's Medical Centre, Nottingham. Academic specialist registrar at Newcastle General Hospital, Newcastle-upon-Tyne from 2006.

Dr Martin Duddy graduated MB, BCh, BAO, (1992), and MD (2000), from Queen's University Belfast. Clinical and research fellowship in neuroimmunology 2001-2 at Montreal Neurological Institute. Consultant Neurologist with special interest in multiple sclerosis at Royal Victoria Infirmary, Newcastle-upon-Tyne from 2003.

Correspondence to:

Dr Stephan R Jaiser,
Department of Neurology,
Newcastle General Hospital,
Westgate Road,
Newcastle-upon-Tyne,
NE4 6BE, UK.
E. stephanjaiser@gmx.net

Figure 1: haemoglobin and white cell count against time. T=transfusion. Cu=initiation of copper replacement.



