

Copper deficiency myeloneuropathy in a patient with previous bariatric surgery

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■ Cite as: *CMAJ* 2019 August 6;191:E866. doi: 10.1503/cmaj.190168

A 54-year-old woman was referred for neuropathic pain after a suicide attempt. She reported progression of painful paresthesias in her feet spreading to her thighs and hands, and 6 months of leg weakness and imbalance leading to a dependent state. Her medical history was notable for multiple bariatric surgeries beginning at age 15 years with a jejunoileal bypass, which required multiple revisions and a Roux-en-Y gastrojejunostomy at age 47 years. The patient ate a standard diet and received supplemental vitamins A, D, E, K, B₁₂, and iron. Examination showed quadriparesis, diffuse hyperreflexia excluding the masseter and Achilles reflexes, and severe proprioceptive and vibration sense loss. These findings suggested myeloneuropathy, and the patient's surgical history suggested a malabsorption syndrome.

Serum investigations showed normocytic anemia, normal vitamin B₁₂ and zinc levels, but a low copper level of 3.9 (normal 10–22) µmol/L. Magnetic resonance imaging (MRI) of the cervical spine showed longitudinally extensive inverted “V” T₂ hyperintensity of the posterior column suggestive of B₁₂ or copper deficiency (Figure 1).

Copper deficiency is an uncommon but treatable cause of neurologic morbidity that is usually due to gastrointestinal surgery or excess zinc intake. Its presentation resembles the subacute combined degeneration of spinal cord caused by B₁₂ deficiency.² The typical findings on MRI of the spine, as seen in our patient (Figure 1), can also be seen in posterior spinal artery infarct, inflammatory demyelination, tabes dorsalis, HIV, human T-lymphotropic virus, nitrous oxide inhalation (causing B₁₂ deficiency), cyanide toxicity (e.g., konzo), radiation myelopathy and methotrexate toxicity.¹

Copper deficiency develops in 10%–20% of patients who have undergone Roux-en-Y gastrojejunostomy, and postoperative copper supplementation is recommended.³ In copper deficiency, treatment with intravenous or oral copper is adjusted to serum

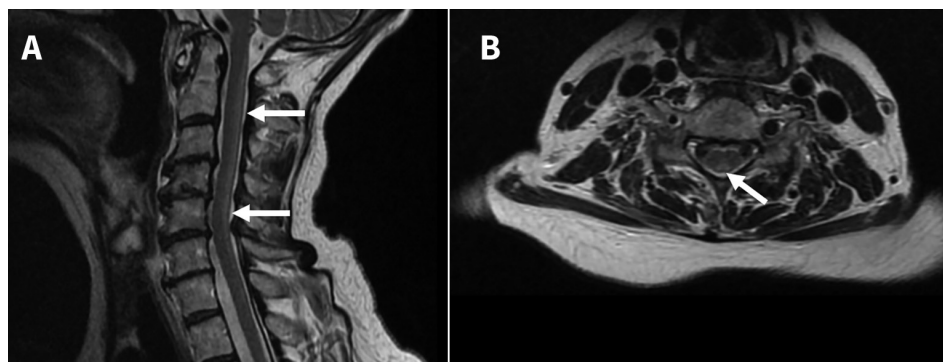


Figure 1: Sagittal T₂-weighted magnetic resonance image of the cervical spine in a 54-year-old woman with copper deficiency showing hyperintensity of the dorsal cord extending from the cervicomedullary junction to the C6 vertebral body level (A, horizontal arrows). An axial T₂-weighted image localized the hyperintensity to the posterior columns (B, diagonal arrow). There was no corresponding enhancement (image not shown).

copper response, and is expected to stabilize symptoms.² Improvement of neurologic symptoms is variable.² Our patient received oral and intravenous copper supplementation and, in the initial months of intensive rehabilitation, showed some functional improvement, allowing her to transfer with assistance and operate a wheelchair.

References

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Competing interests: None declared.

This article has been peer reviewed.

The authors have obtained patient consent.

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