CASE REPORT

Polyradiculopathy secondary to severe hypertriglyceridemia

Cassie Nesbitt,¹ Daniel Wong,² Peter Batchelor²

¹Department of Neurology, Barwon Health, Barwon Heads, Victoria, Australia

²Department of Neurology, Barwon Health, Geelong, Victoria, Australia

Correspondence to

Dr Cassie Nesbitt, cassie_nesbitt@hotmail.com

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SUMMARY

A 74-year-old man presented with a subacute severe thoracic polyradiculopathy affecting the T4–T8 dermatomes bilaterally. Extensive investigation demonstrated markedly raised triglyceride levels of 44 mmol/L (<1.7). The patient's unique presentation is discussed alongside a review of triglyceride-induced neurotoxicity and therapeutic management.

BACKGROUND

Hypertriglyceridemia is an uncommon but recognised cause of peripheral neuropathies and radiculopathies. The damage from this process is irreversible, and hence early recognition and treatment, alongside prevention with appropriate diet and pharmacotherapy, is essential as it could potentially slow the progression of this debilitating condition and improve quality of life.

CASE PRESENTATION

A 74-year-old man was referred for further investigation and management of a severe thoracic polyradiculopathy. The patient had been experiencing several months of increasing thoracic radicular neuropathic pain unresponsive to pregabalin, amitriptyline, opiates and simple analgesia. The patient's pain affected his ability to perform all activities of daily living. The patient had a history of type II diabetes well controlled on metformin with glycated haemoglobin of 6.4% without microvascular or macrovascular complications, as well as indolent chronic lymphocytic leukaemia (CLL), managed by observation only with no progression over the past 4 years.

There was no family history of hypercholesterolemia or hypertriglyceridemia and no history of early-onset vascular or metabolic disease. On examination, motor and sensory function was intact to all modalities, and reflexes were preserved. There was no evidence of vesicles over the back or trunk. Sharp and temperature sensation was heightened around T4–T8 dermatomes bilaterally. There was no evidence of sensory disturbance in the upper and lower limbs.

INVESTIGATIONS

The patient was extensively investigated with normal MRI of the brain and whole spine. Full blood examination was within normal limits. The lymphocyte count had remained at $5.0 \times 10^9/L$ (1.0–4.0) for the past 3 years, indicating ongoing indolent CLL with no effect on the other blood counts. Autoimmune screening including antinuclear

antibodies, extractable nuclear antigens, antineutrophil cytoplasmic antibodies, erythrocyte sedimentation rate, C reactive protein, double-stranded DNA, ACE and C3 and C4 were all negative. The patient had normal thyroid function and electrolytes, and normal copper, folate, vitamin B₁₂, vitamin D, vitamin A and vitamin E levels. Serology excluded herpes simplex and varicella infection. Serum protein electrophoresis revealed albumin of 39 (34–50 g/L) and protein of 65 (63–83 g/L). The immunoglobulins revealed IgM of 0.9 (0.5–3 g/L), IgG of 7 (6.8–16.5 g/L) and IgA of 1.8 (0.8–3.5 g/L). There was no evidence of glycosuria or proteinuria. A CT of the chest, abdomen and pelvis was performed to exclude any evidence of malignancy. Cerebrospinal fluid (CSF) studies were unremarkable and excluded evidence of central nervous system involvement of the patient's CLL. Furthermore, given the patient's history of CLL, serum and CSF antineuronal antibodies and serum antibodies to myelin-associated glycoprotein were studied and were all negative. Peripheral nerve conduction studies and electromyography were also unremarkable with no evidence of a large fibre motor or sensory neuropathy.

The only outstanding investigation was that of grossly abnormal lipid profiles with fasting cholesterol of 15.2 mmol/L (<5.5) and triglycerides of 44 mmol/L (<1.7), untreated due to the patient not tolerating statin therapy, having experienced increased fatigue in the past.

TREATMENT

Satisfactory analgesia was achieved after 6 days with a ketamine infusion, pregabalin and amitriptyline and simple oral analgesics. The patient was started on therapy for his abnormal lipid profile using a combination of ezetimibe and simvastatin (10/80 mg) daily.

OUTCOME AND FOLLOW-UP

Unfortunately, the patient's analgesic control was not sustained and pain again became troublesome after 4 weeks. Trigger point injections of lignocaine and steroids provided some further pain relief, together with physiotherapy for pacing strategies and postural control.

DISCUSSION

We report a case of severe polyradiculopathy with no obvious aetiology, following extensive investigation other than severe hypertriglyceridemia. Various studies^{1–3} reveal that hypertriglyceridemia can lead to peripheral neuropathy. Kaseem *et al*¹

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studied 24 patients with hypertriglyceridemia (with no other cause of neuropathy present), of which 70.8% demonstrated early signs of peripheral neuropathy on nerve conduction studies. Mcmanis *et al.*² in their study, mentioned six patients with painful neuropathy, thought to be secondary to derangement in lipid profile after extensively excluding other causes of neuropathy. One of the patients in Phillip's study treated early for severe hyperlipidemia went on to become symptom free. Another case report by Hou *et al.*³ highlights a case of peripheral neuropathy thought to be secondary to hypertriglyceridemia, after excluding other pathologies with extensive investigation. All the patients in these cases had severe hypertriglyceridemia with thorough work up to exclude other common causes of neuropathy such as diabetes, vitamin B₁₂ deficiency, haematological pathologies and renal disease, alongside other less common pathologies. Shankar looked at a subgroup of patients with concurrent diabetes and hypertriglyceridemia with peripheral neuropathy. The results of that study concluded that diabetic sensory neuropathy severity correlates with the severity of hypertriglyceridemia suggesting that the triglycerides augment the neuropathic process.⁴

Isolated truncal neuropathy is uncommon in the setting of diabetic disease and is usually associated with advanced age and poor glycaemic control. Our patient did have a concurrent history of diabetes; however, this was well controlled. The patient also has indolent CLL with no evidence on laboratory and neurophysiological studies of an associated paraneoplastic or paraproteinaemic demyelinating neuropathy. In the context of well-controlled diabetes, the patient's significant hyperlipidemia is the most likely aetiological factor for his neuropathy. His presentation with an isolated truncal radiculopathy is unique, with other hyperlipidemia-induced neuropathies so far reported being peripheral polyneuropathies.

The mechanism of neuropathy secondary to deranged triglyceride level has also been described in the medical literature. There is some evidence that the raised triglycerides result in oxidative stress injuries specifically at the dorsal root ganglia neurons, which would explain the process of radiculopathy in our case.³ It is also hypothesised that high triglyceride levels induce microangiopathy in blood vessels, leading to a lack of blood supply to small nerve fibre, similar to the mechanism seen in diabetic neuropathies.^{4 5}

Vincent *et al.*⁶ looked at the toxic effect of hypertriglyceridemia and nerve oxidative stress at the dorsal root ganglia in mice. They found that dyslipidemia leads to high levels of oxidised

low-density lipoproteins that injure the dorsal root ganglia via lipoxygenase 1 receptor interactions contributing to the development of neuropathy. They also identified that early dyslipidemia is an independent risk factor for developing a diabetic neuropathy and can precede the onset of glucose intolerance, a notion supported by other large studies.⁷

Learning points

- ▶ Hypertriglyceridemia can lead to a spectrum of subclinical through severe neuropathies.
- ▶ Neuropathy from hypertriglyceridemia can affect the dorsal root ganglia leading to a radiculopathy.
- ▶ Therapy targeted at lowering triglyceride levels can potentially reverse or reduce neuropathy progression, reinforcing the need to recognise this underlying pathology.

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Competing interests None declared.

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