Treatment Induced Neuropathy of Diabetes Complicated by Orthostatic Hypotension: A Case Report

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CASE BACKGROUND

Treatment-induced neuropathy of diabetes (TIND) is a rare, iatrogenic small-fiber neuropathy caused by the rapid lowering of glucose levels in patients with poorly controlled diabetes.[1,2] TIND is defined as the acute onset of neuropathic pain and or/autonomic dysfunction within 8 weeks of lowering glycosylated hemoglobin A1C (HbA1c) levels by ≥ 2% points over a 3-month period.[1,2]

An important positive correlation exists between the magnitude and rate of change in HbA1c levels and the severity of symptoms. The more significant and rapid the decrease in HbA1c levels, the greater the intensity and distribution of neuropathic pain. The degree of autonomic dysfunction also correlates with the magnitude of change in HbA1c levels. (see **Figure 1**).[1]

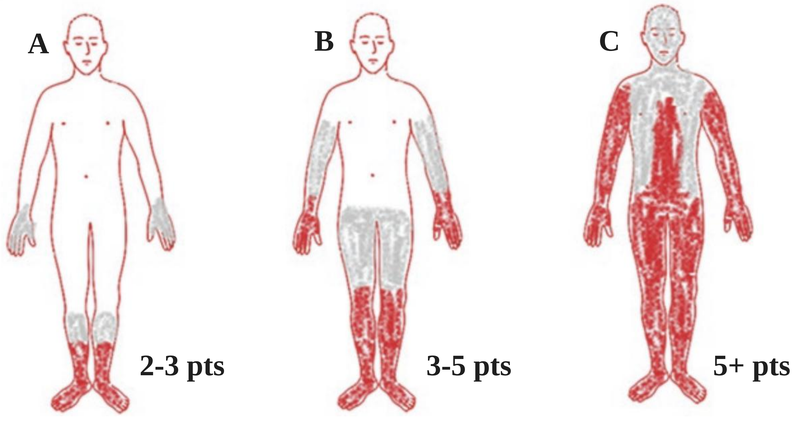

Figure 1: Pain distribution in individuals with TIND correlating to change in HbA1C. (A) Smallest change in HbA1C, (B) more rapid decrease in HbA1C, (C) largest decrease in HbA1C with the widest pain distribution.[1]

PATHOPHYSIOLOGY

The pathophysiology of TIND remains largely unknown with two prevailing theories (see **Figure 2**).[2] One theory is that during periods of relative hyperglycemia, blood vessels proliferate to form arteriovenous shunts.[7] As glucose levels start to decline, these new blood vessels are unable to remodel at an adequate rate, which shunts blood away from the endoneurium and causes acute neuropathy.[3,7]

An alternative theory is that rapid correction of glycemic levels may induce a period of relative hypoglycemia. This metabolic imbalance acts as a stress response that produces proinflammatory cytokines which damage myelinated nerves.[3,6]

CASE REPORT

A 50-year-old female with a significant history of poorly controlled type 2 diabetes mellitus (DM2) complicated by peripheral neuropathy and presented to the emergency department (ED) as a Level 1 trauma following a syncopal fall. The patient reported a week-long history of lightheadedness, nausea, and progressive instability. She experienced loss of consciousness during the fall but was uncertain if she struck her head.

During syncopal evaluation, the patient denied a prior history of stroke or seizures but reported long-standing orthostatic hypotension. On admission, orthostatic testing revealed a significant blood pressure drop from 168/83 to 95/68 mmHg upon sitting. A CT pan-scan (head, cervical, thoracic, and lumbar spine, chest, abdomen, and pelvis) revealed no acute processes.

Physical examination showed full strength in bilateral upper extremities but 1/5 strength in bilateral lower extremities. Sensation was intact to pain and light touch. Reflexes were also intact. Babinski's sign was negative. During the current admission, laboratory evaluations were unremarkable.

Per chart review, the patient presented two months earlier with bilateral lower extremity weakness and paresthesias. A formal diagnosis of type II diabetes mellitus was made 5 months prior when the patient's HbA1c levels were reduced from 15.0 to 7.1. The patient was ultimately assigned a diagnosis of treatment-induced neuropathy of diabetes after confirmation by EMG.

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DISCUSSION

Rapid glycemic control was associated with significant peripheral neuropathy and orthostatic hypotension consistent with TIND.

While no clear consensus about rates of glycemic change exists, recommendations include a target change in **HbA1c of less than 2 percentage points over 3 months**.[3]

This case study underscores the significant gap in the literature regarding TIND and its potential progression to multisystem involvement. We emphasize the importance of clinical recognition to prevent or mitigate the progression of this acute neuropathy. By highlighting this case, we aim to draw greater attention to TIND in both clinical medicine and future research efforts. Continued studies are essential to improve outcomes and develop effective disease-modifying strategies for TIND patients.

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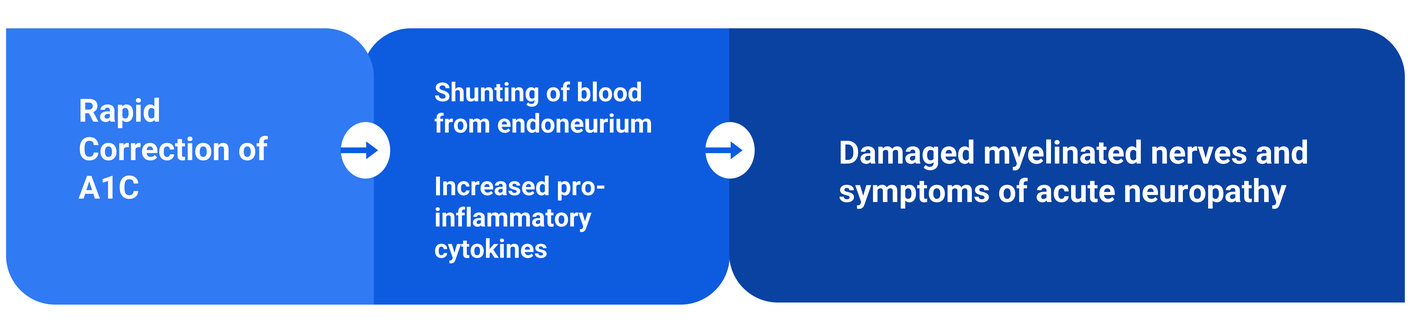

Figure 2: Impact of rapid correction of HbA1c in neuronal pathology.[7]