

# Ptosis as the only manifestation of diabetic superior division oculomotor nerve palsy

## A case report

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### Abstract

**Rationale:** Diabetic oculomotor nerve palsies, also called ischemic third nerve palsies, are the most common etiologic subset of oculomotor nerve palsy in adults. Diabetic oculomotor nerve palsies typically present with ptosis and diplopia, but pupillary function is often spared. The oculomotor nerve separates into superior division and inferior division, with the superior division innervating the superior rectus and levator palpebrae superioris. The diabetic oculomotor nerve palsy may affect isolated superior or inferior division of the oculomotor nerve, but diplopia usually exists.

**Patient concerns:** A 56-year-old female was admitted to our hospital for acute onset right upper lid ptosis. The patient denied diplopia or other new focal neurologic symptoms. The neurological examination revealed ptosis of the right upper eyelid only, and other neurological examination revealed negative findings.

**Diagnoses:** The diagnosis of diabetes-associated oculomotor nerve palsy was made, with acute ptosis as its only manifestation.

**Interventions:** We controlled her blood sugar aggressively with insulin.

**Outcomes:** After the hyperglycemia improved, the right side ptosis recovered partially within one week.

**Lessons:** From this case, we suggest that when evaluating patients with acute onset ptosis as the only manifestation, diabetic-vasculopathic neuropathy should be considered. This case also implies that the most inferior portion of the third cranial nerve may consist of nerve fibers mainly innervating the levator palpebrae superioris.

**Keywords:** diabetes, oculomotor nerve, ptosis

## 1. Introduction

Diabetic neuropathy is one of the most common long-term complications of type 2 diabetes, and its prevalence varies with both the severity and duration of hyperglycemia. Approximately 50% of patients with diabetes mellitus type I or type II will eventually develop neuropathy.<sup>[1–3]</sup> The clinical presentation may be polyneuropathy, autonomic neuropathy, polyradiculopathies, or mononeuropathies, although many overlap syndromes occur.

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The most common diabetic cranial mononeuropathies occur in those nerves which supply the extraocular muscles, especially cranial nerves III (oculomotor), VI (abducens), and IV (trochlear). The oculomotor nerve separates into superior and inferior division, and the superior division innervates the superior rectus and levator palpebrae superioris. Nevertheless, isolated superior division oculomotor nerve palsies are rare and generally result from structural lesions.<sup>[4]</sup> We describe a patient with ptosis as the only manifestation of diabetic superior division oculomotor nerve palsy that recovered partially after the blood sugar was well-controlled.

## 2. Case report

A 56-year-old Taiwanese female presented to the emergency room of our hospital with acute onset right upper lid ptosis, noted since 4 days ago. The patient reported the right upper lid ptosis with progressive course, while no diurnal change was noted. The patient denied diplopia, blurred vision, periorbital pain, headache, focal numbness, and weakness. The patient also denied recent head trauma and prodromal symptoms suggestive of a viral illness. Other medical problems included diabetes mellitus type II without appropriate control and diabetic nephropathy. Her usual medication before admission included short-acting insulin 3 times a day and long-acting insulin, but her compliance was poor. She never drinks or smokes.

The brain computed tomography performed in the emergency room showed no intracranial lesion. On admission, the physical examination revealed no significant ophthalmological finding. The neurological examination revealed ptosis of the right upper eyelid. The pupils were equal and normally reactive. The extraocular movement and ocular alignment were normal. Other neurological examination revealed negative findings. During

hospitalization, we initially prescribed aspirin for suspected acute ischemic stroke. Serial laboratory studies were normal except hyperglycemia (256 mg/dL) and the glycated hemoglobin (8.3%). Brain magnetic resonance imaging with contrast showed normal result. There was no clinical or laboratory evidence consistent with the diagnosis of myasthenia gravis, Lyme disease, syphilis, temporal arteritis, or other systemic vasculitis. We controlled her blood sugar aggressively by insulin aspart 12 units before each meal and insulin detemir 24 units at bedtime with subcutaneous injections, and kept her blood sugar below 150 mg/dL during admission. With intensive sugar control for 7 days, her blood sugar before discharge was 137 mg/dL. After the hyperglycemia improved, the right side ptosis recovered partially within 1 week both subjectively and objectively. The diagnosis of diabetes-associated oculomotor nerve palsy was made.<sup>[5,6]</sup> Diabetes-induced ischemic injury of nerve fibers innervating levator palpebrae superioris is the most possible cause.

### 3. Discussion

Third nerve palsy typically manifests as diplopia and ptosis. Partial oculomotor weakness may show only mild ptosis, and eye movement abnormalities can be subtle. Diabetic 3rd nerve palsies are the most common etiologic subset of 3rd nerve palsy in adults. The etiology of diabetic neuropathy is hyperglycemia-induced damage to nerve cells and neuronal ischemic change.<sup>[3]</sup> The inflammation and immune reaction may also be the cause of diabetic neuropathy.<sup>[7]</sup> The classical presentation of oculomotor nerve palsy in diabetes is that of an acute onset diplopia with ptosis and pupillary sparing, this is due to the anatomical arrangement of the nerve fibers in the 3rd cranial nerve since fibers controlling the pupillary reflex are superficial, thus spared from diabetic ischemia induced injury. The oculomotor nerve separates into superior division and inferior division, with the superior division innervating the superior rectus and levator palpebrae superioris. The diabetic 3rd nerve palsy may affect isolated superior or inferior division of the oculomotor nerve,<sup>[4,8,9]</sup> but diplopia usually exists.<sup>[10–12]</sup> Although the anatomical division of the 3rd cranial nerve occurs in the region of the anterior cavernous sinus or superior orbital fissure, there is a topographical arrangement of the motor fibers within the cisternal portion of the nerve.<sup>[13]</sup> Even though,

affecting only the nerve fibers that innervate the levator palpebrae superioris is rare in diabetic superior division oculomotor nerve palsy.

We report a rare case of partial oculomotor neuropathy caused by diabetes with acute ptosis as its only manifestation. From this case, we suggest that when evaluating partial superior division oculomotor nerve palsies manifesting as ptosis only, vasculopathic neuropathy should be considered. In diabetic 3rd cranial nerve palsy, the infarction initially occurs in the smallest vessels that are supplying the interior portion of the 3rd nerve. It seems that the ischemic lesions of the precavernous nerve could selectively affecting nerve fibers innervating the levator palpebrae superioris only,<sup>[4]</sup> thus implying that the most interior portion of the 3rd nerve may consist of nerve fibers innervating the levator palpebrae superioris.

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