



NEURO-OPHTHALMOLOGIC MANIFESTATIONS OF DIABETIC CRANIAL NEUROPATHY: CLINICAL FEATURES AND NEUROLOGICAL ASSESSMENT

Telmanova Navbakhar Erkin kizi,

Parpiyeva Yulduz Ravshanovna

Department of Neurology and Medical Psychology, Tashkent State

Medical University, Tashkent, Uzbekistan

E-mail: navbahortelmanova@gmail.com

Phone: +998905776626

Annotation: *Diabetic cranial neuropathy is a relatively rare but clinically important neurological complication of diabetes mellitus associated with dysfunction of cranial nerves and neuro-ophthalmologic impairment. The condition most commonly affects the oculomotor, abducens, and trigeminal nerves, leading to diplopia, ptosis, ophthalmoplegia, retro-orbital pain, and sensory disturbances. Despite increasing prevalence of diabetes mellitus worldwide, diabetic cranial neuropathy remains insufficiently investigated, particularly regarding objective neurological assessment and clinical manifestations. The present study aimed to evaluate neuro-ophthalmologic manifestations and neurological impairment in patients with diabetic cranial neuropathy using standardized neurological assessment scales. This observational clinical study included 10 patients with diabetes mellitus presenting with signs of cranial nerve dysfunction who underwent neurological evaluation and treatment. The study population consisted of 6 women (60%) and 4 men (40%), with a mean age of 54 ± 1.8 years. Neurological severity was assessed using the Neurological Symptom Score (NSS) and Neuropathy Disability Score (NDS). Clinical manifestations, duration of diabetes mellitus, vascular comorbidities, and therapeutic outcomes were analyzed. The results*



demonstrated that oculomotor nerve involvement was the most frequent neurological finding and was observed in 50% of patients. Abducens nerve dysfunction was identified in 30% of patients, while trigeminal nerve involvement was detected in 20% of cases. Diplopia represented the predominant neuro-ophthalmologic manifestation, occurring in 70% of patients, followed by limitation of extraocular eye movements (60%), ptosis (50%), retro-orbital pain (40%), and facial hypoesthesia (20%). Mean NSS and NDS values indicated moderate neurological impairment among the examined patients. Higher neurological severity scores were observed in patients with long-standing diabetes mellitus and concomitant vascular complications. Following comprehensive therapeutic management, positive neurological improvement was observed in the majority of patients during the follow-up period. The findings emphasize the importance of early neurological and neuro-ophthalmologic assessment in diabetic patients presenting with cranial nerve dysfunction. The use of NSS and NDS scales may improve objective evaluation of neurological impairment and facilitate timely therapeutic intervention in diabetic cranial neuropathy.

Keywords: *Diabetic cranial neuropathy, diabetes mellitus, neuro-ophthalmologic manifestations, diplopia, ophthalmoplegia, NSS, NDS, neurological assessment*

Intraduction: Diabetes mellitus is one of the most common chronic metabolic disorders worldwide and represents a major public health problem associated with numerous systemic and neurological complications. Long-standing diabetes mellitus may lead to progressive vascular and metabolic disturbances affecting both the peripheral and central nervous systems. Among neurological complications, diabetic neuropathies remain one of the most frequently encountered conditions in clinical practice. Diabetic cranial neuropathy is considered a relatively uncommon but clinically significant form



of diabetic neuropathy characterized by dysfunction of cranial nerves, particularly the oculomotor, abducens, and trigeminal nerves. Patients with diabetic cranial neuropathy often develop neuro-ophthalmologic manifestations including diplopia, ptosis, ophthalmoplegia, retro-orbital pain, and sensory impairment. These symptoms may substantially affect visual function, daily activity, and quality of life. The pathogenesis of diabetic cranial neuropathy is mainly associated with microvascular ischemic injury, chronic metabolic imbalance, endothelial dysfunction, and impaired nerve perfusion. Vascular comorbidities such as arterial hypertension, dyslipidemia, and diabetic microangiopathy may contribute to the progression of neurological impairment and delayed clinical recovery. Early diagnosis of diabetic cranial neuropathy remains clinically important because neuro-ophthalmologic manifestations may mimic other neurological, inflammatory, or vascular disorders. Objective neurological evaluation using standardized assessment scales may improve diagnostic accuracy and facilitate monitoring of neurological deficits. Neurological Symptom Score (NSS) and Neuropathy Disability Score (NDS) are commonly used clinical tools for evaluation of diabetic neuropathic manifestations and functional neurological impairment. However, limited clinical data are available regarding their application in patients with diabetic cranial neuropathy and neuro-ophthalmologic dysfunction. The present study aimed to evaluate neuro-ophthalmologic manifestations, neurological impairment, and clinical characteristics of diabetic cranial neuropathy using NSS and NDS assessment scales.

Materials and Methods

This observational clinical study included 10 patients with diabetes mellitus presenting with clinical manifestations of cranial nerve dysfunction who were referred for neurological examination and treatment. The study population consisted of 6 women (60%) and 4 men (40%), with a mean age of 54 ± 1.8 years. All patients underwent detailed neurological and neuro-



ophthalmologic examinations. Clinical neurological evaluation included assessment of cranial nerve function, ocular motor disturbances, facial sensory impairment, and associated neurological symptoms. Particular attention was paid to neuro-ophthalmologic manifestations including diplopia, ptosis, retro-orbital pain, limitation of extraocular eye movements, and facial hypoesthesia. Neurological severity and functional impairment were assessed using the Neurological Symptom Score (NSS) and Neuropathy Disability Score (NDS). The NSS scale was applied to evaluate subjective neurological symptoms including sensory disturbances, pain, numbness, and motor complaints, while the NDS scale was used to assess objective neurological deficits and functional disability. Additional clinical assessment included evaluation of diabetes duration and associated vascular comorbidities including arterial hypertension, diabetic microangiopathy, and dyslipidemia. All patients received comprehensive therapeutic management including neurotropic therapy, vascular supportive treatment, symptomatic therapy, and standard antidiabetic treatment according to clinical recommendations. Descriptive statistical analysis was performed. Quantitative variables were expressed as mean $\pm$ standard deviation, while qualitative variables were presented as percentages.

Results

A total of 10 patients with diabetic cranial neuropathy were included in the study. The study population consisted of 6 women (60%) and 4 men (40%). The mean age of patients was 54 ± 1.8 years. Oculomotor nerve involvement was identified in 5 patients (50%), abducens nerve dysfunction in 3 patients (30%), and trigeminal nerve involvement in 2 patients (20%). Diplopia was observed in 7 patients (70%), ptosis in 5 patients (50%), retro-orbital pain in 4 patients (40%), facial hypoesthesia in 2 patients (20%), and limitation of extraocular eye movements in 6 patients (60%). The mean Neurological Symptom Score (NSS) was 5.2 ± 0.6 points, while the mean Neuropathy Disability Score (NDS) was 6.1 ± 0.5 points. Higher NSS and NDS values were



observed in patients with diabetes duration exceeding 10 years and concomitant vascular complications. Arterial hypertension was identified in 6 patients (60%), diabetic microangiopathy in 5 patients (50%), and dyslipidemia in 4 patients (40%). Following comprehensive therapeutic management, neurological improvement was observed in 7 patients (70%) during the follow-up period. Partial regression of diplopia and improvement of ocular motor function were the most frequently documented clinical changes.

Discussion

Diabetic cranial neuropathy represents a relatively rare but clinically significant neurological complication of diabetes mellitus. In the present study, oculomotor nerve involvement was the most frequent finding, followed by abducens and trigeminal nerve dysfunction. Similar clinical patterns have been described in previous studies investigating diabetic ophthalmoplegia and ischemic cranial neuropathies. The predominance of diplopia and ocular motor dysfunction observed in the examined patients confirms the important neuro-ophthalmologic component of diabetic cranial neuropathy. Previous clinical studies have demonstrated that diplopia and ptosis are among the most common manifestations of diabetic oculomotor nerve dysfunction and may significantly reduce patients' quality of life. The use of NSS and NDS scales in the present study allowed objective assessment of neurological impairment and functional deficits. Patients with long-standing diabetes mellitus and concomitant vascular complications demonstrated more pronounced neurological impairment and slower clinical improvement. These findings are consistent with current evidence suggesting that chronic vascular and metabolic disturbances contribute to progressive neurological dysfunction in diabetic neuropathies. Arterial hypertension, diabetic microangiopathy, and dyslipidemia were frequently observed among examined patients, supporting the role of vascular factors in the pathogenesis of diabetic cranial neuropathy. Chronic ischemic damage affecting cranial nerves may lead to impaired ocular motor function



and persistent neuro-ophthalmologic symptoms. Comprehensive therapeutic management including neurotropic, vascular supportive, symptomatic, and antidiabetic therapy resulted in positive neurological improvement in the majority of patients. Improvement of diplopia and ocular motor dysfunction represented the most common positive clinical outcomes during follow-up observation. The present study is limited by the relatively small sample size and observational design. Nevertheless, the findings provide clinically relevant information regarding neuro-ophthalmologic manifestations and neurological assessment in diabetic cranial neuropathy.

Conclusion

Diabetic cranial neuropathy is predominantly associated with neuro-ophthalmologic manifestations, particularly diplopia, ophthalmoplegia, and oculomotor dysfunction. NSS and NDS scales provide useful tools for objective assessment of neurological impairment and functional deficits in affected patients. Long-standing diabetes mellitus and vascular comorbidities appear to contribute to more severe neurological manifestations and delayed clinical recovery. Early neurological evaluation and comprehensive therapeutic management may improve clinical outcomes and reduce persistent neuro-ophthalmologic dysfunction in patients with diabetic cranial neuropathy. The findings of the present study contribute additional clinical evidence regarding neurological assessment and neuro-ophthalmologic manifestations in diabetic cranial neuropathy and may support further clinical investigations in this field.

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