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Vestibular function impairment in individuals with diabetic peripheral neuropathy

Aim: To examine vestibular evoked myogenic potential (VEMP) in individuals with diabetic peripheral neuropathy (DPN).
Methods: This was a cross-sectional study including 89 patients with Type 2 Diabetes and 42 healthy controls without a history of vestibular complaints. Individuals with diabetes were divided into 3 groups: 29 patients with no peripheral neuropathy (NDPN group), 26 patients with asymptomatic neuropathy (SDPN group), 34 patients with symptomatic neuropathy (DPN group). Clinical and biochemical characteristics were included for all individuals. Latencies and amplitude parameters were measured for ocular and cervical myogenic potentials in the four groups of individuals.
Results: The latency of n10, p15 (oVEMP), p13, n23 (cVEMP) were significantly prolonged in the SDPN and DPN groups compared to healthy control individuals and individuals with diabetes without DPN (p=0.05). The oVEMP latency (p15) and cVEMP latency (p13, n23) positively correlated with HbA1c, fasting blood glucose (FBG), and diabetes duration. The oVEMP latency (n10) positively correlated with HbA1c and FBG.
Conclusions: Patients with diabetic peripheral neuropathy have signs of vestibular dysfunction. VEMP may be useful in assessing vestibular impairment in diabetic patients.

Comments. Individuals with type 2 diabetes have an increased incidence of vestibular dysfunction, which may be even higher in individuals with DPN. Vestibular dysfunction may present as a "subclinical vestibular neuropathy" leading to postural instability and fall accidents. The ipsilateral sacculus and inferior vestibular nerve function is estimated by cVEMP, and the contralateral utriculus and superior vestibular nerve function is measured by the oVEMP. Previous studies (Bektas D et al *Acta Otolaryngol. 2008;128:768-71*) found no difference in cVEMP responses between individuals with diabetes with and without diabetic polyneuropathy (DPN) and healthy controls. However, other studies have found decreased cVEMP and oVEMP amplitudes *(*Konukseven E et al *Int J Audiol. 2015;54:536-43*) or prolonged latencies (Kalkan M et al *Eur Arch Otorhinolaryngol. 2018;275:719-724*) in individuals with diabetes compared to healthy controls.
This cross-sectional study showed that the oVEMP and cVEMP latencies (n10, p15, p13, n23) were prolonged in individuals with type 2 diabetes with DPN, compared to individuals with diabetes without DPN and healthy controls. The latencies correlated with FBG, HbA1c, and diabetes duration. The study strengths include the use of VEMP-testing as a quantitative objective way of measuring vestibular function. However, the study has limitations as the cross-sectional design does not allow for conclusions on causality and effects over time. Furthermore, it is not described if the individuals were examined using validated neuropathy clinical scales and which nerve conduction studies and clinical criteria was used to stratify the groups. Future studies should consider a longitudinal design and include individuals with falls to assess if there is an association.
This study provides additional evidence for impaired vestibular end nerve function in individuals with diabetes with and without DPN.

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Reference. Zhang J, Ye L, Bai X, Huang Y, Lin J, Huang H. Cervical and ocular vestibular evoked myogenic potentials in patients with Diabetic Peripheral Neuropathy. Diabetol Metab Syndr. 2023 May 12;15(1):100. doi: 10.1186/s13098-023-01068-z. PMID: 37170313; PMCID: PMC10176784.
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