

Memory domain is altered in type 1 diabetes in relation to painless diabetic neuropathy

Aim: To investigate cognitive function in adults with type 1 diabetes mellitus (T1DM) and its association with painful/painless diabetic peripheral neuropathy (DPN) and clinical parameters.

Methods: This is a cross-sectional, observational, case-control study. 58 participants with T1DM were included and sub-grouped into 20 participants with painful DPN, 19 with painless DPN, and 19 participants without DPN. In addition, 20 healthy controls were studied. The participants performed Addenbrooke's examination III (ACE-III), which assesses attention, memory, verbal fluency, language, and visuospatial skills. Working memory was evaluated using an N-back task. Cognitive scores were compared between the groups and correlated to age, diabetes duration, HbA1c, and nerve conduction measurements.

Results: Compared to healthy controls, T1DM participants showed lower values of total ACE-III ($p=0.028$), memory ($p=0.013$), and language scores ($p=0.028$), together with longer reaction times in the N-back task ($p=0.041$). 21% of the participants with T1DM met the criteria for cognitive impairment, while the prevalence was 5% for the healthy controls. Subgroup analyses demonstrated lower memory scores in those with painless DPN compared with healthy controls ($p=0.013$). No differences were observed between the three T1DM subgroups. Cognitive scores and clinical parameters were not associated.

Conclusion: This study supports the notion of cognitive alterations in T1DM and indicates that cognitive function is altered in T1DM regardless of underlying neuropathic complications. The memory domain appears altered in T1DM, particularly in those with painless DPN.

Comments. Cognitive function is impaired in patients with T1DM. However, the relationship with neuropathy is not widely described. No previous studies have examined the difference in cognitive function in various phenotypes of DPN. Interestingly, the participants with T1DM and painless DPN revealed a lower memory score than healthy controls. This result confirms the involvement of the central nervous system in subjects with peripheral nerve damage. Interestingly, chronic pain did not worsen the cognitive function in the study group. Finally, despite the quite small sample size, the subgroups were well-characterized, and the study results direct our attention to the clinical usefulness and practical relevance of simple questionnaires for assessing cognitive functions.

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Reference. Croosu SS, Gjela M, Røikjer J, Hansen TM, Mørch CD, Frøkjær JB, Ejskjaer N. Cognitive function in individuals with and without painful and painless diabetic polyneuropathy-A cross-sectional study in type 1 diabetes. *Endocrinol Diabetes Metab.* 2023 Apr 18:e420. doi: 10.1002/edm2.420. ahead of print. PMID: 37073434.

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