

Gastrointestinal autonomic neuropathy in adolescents with type 1 diabetes

Aims: If not identified in time, diabetic neuropathy affecting the gastrointestinal tract can result in many debilitating consequences, such as unregulatable blood glucose and symptoms of poor appetite, vomiting, diarrhea, and constipation. This study investigated gastrointestinal neuropathy through associations between gastrointestinal symptoms or functions and autonomic cardiovascular or sudomotor function in adolescents with type 1 diabetes compared to healthy age-matched controls.

Methods: Adolescents (15-19 years old) with and without type 1 diabetes underwent wireless motility capsule investigation, where information regarding transit times and contraction patterns were extracted. Symptoms were assessed with a gastrointestinal symptom-specific questionnaire. Autonomic testing consisted of cardiovascular autonomic reflex tests and quantitative sudomotor reflex tests.

Results: Fifty adolescents with type 1 diabetes and 20 healthy controls were investigated. The two groups had similar gastrointestinal function, autonomic function, and symptoms. However, adolescents with diabetes had altered colon motility, which was associated with diarrhea, indigestion, and suboptimal blood glucose levels. The gastrointestinal function was not associated with autonomic cardiovascular or sudomotor function measures.

Conclusions: This study is the first to report discrete changes in contractility patterns of adolescents with type 1 diabetes, suggesting early alteration of the gastrointestinal tract, which may eventually induce more severe complications. However, possibly due to the complex neurological regulation of the gastrointestinal tract and the many independent branches of the autonomic nervous system, an association between autonomic measures of cardiovascular or sudomotor function and gastrointestinal function was not found.

Comments. Neuropathy affecting the gastrointestinal tract is a debated but still clinically underrecognized complication of diabetes. Historically, this is mainly due to the relative inaccessibility of the gastrointestinal tract and the apparent lack of association with measures of peripheral and autonomic neuropathies. However, new technologies have allowed us to investigate gastrointestinal function more comprehensively through ingestible wireless capsules, resulting in a plethora of information about gastrointestinal dysfunction. On top of our increased understanding of neuropathies suggest that they do not progress linear and that associations between different types are not likely to exist in those affected. Additionally, more specific and agreed-upon methods for the general investigation of neuropathy are needed.

This study's result highlights those discrete changes in the gastrointestinal tract that already occur early in the disease, even before measurable neuropathies in another system. With the knowledge that severe changes in the gastrointestinal tract can result in a lack of proper food intake, poor uptake of nutrients, and disrupt the administration schedule of antidiabetic medications, the study's result suggests that more notice about the gastrointestinal tract should be taken earlier on. In this way, precautions can be taken to minimize complications further down the line, including treating gastrointestinal diseases such as gastroparesis, diarrhea, and constipation.

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Reference. Rasmussen VF, Thrysoe M, Karlsson P, Vestergaard ET, Kristensen K, Christensen AR, Nyengaard JR, Terkelsen AJ, Brock C, Krogh K. Early Gastrointestinal Neuropathy Assessed by Wireless Motility Capsules in Adolescents with Type 1 Diabetes. *J Clin Med.* 2023 Feb 28;12(5):1925. doi: 10.3390/jcm12051925. PMID: 36902712

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