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# Gastric emptying is rapid in adolescents with type 1 diabetes and relates to gastrointestinal symptoms

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Gastric emptying is a critical determinant in postprandial glycaemic control. This study aimed to assess whether gastric emptying in adolescents with type 1 diabetes (T1D) relates to gastrointestinal symptoms and to heart rate variability (HRV) as a measure of autonomic function.

We studied 30 adolescents (age 15 ± 2.5 years, BMI 22 ± 3.1 kg/m$^2$) with T1D. Subjects consumed a $^{13}$C labelled pancake meal. Gastric emptying was measured by $^{13}$C breath test. Blood glucose was monitored frequently over 4 hours and gastrointestinal symptoms at 30-60 minute intervals, by a visual analogue questionnaire. Chronic gastrointestinal symptoms over the previous 3 months were assessed by a validated Diabetes Bowel Symptoms Questionnaire [1]. HRV was assessed by LabChart Pro [2].15 age and sex matched controls were also studied.

Gastric half emptying time was accelerated in adolescents with T1D compared to controls; 77.6 (61.4-99.3) minutes [median (IQR)] versus 109.1 (70.8-124.2), P = 0.02), independent of hyperglycaemia during the study, HbA1c, duration of diabetes, and BMI.

There was no difference in the prevalence of chronic symptoms or symptoms of a severity that affected lifestyle between the two groups.

The presence of nausea, vomiting, bloating and/or fullness during the study in T1D was associated with faster gastric emptying compared to asymptomatic T1D (r =0.55; p = 0.04), and this was independent of peak glucose and glucose at 4 hours.

Rate of gastric emptying in T1D did not correlate with HRV.

Adolescents with T1D have rapid gastric emptying associated with acute gastrointestinal symptoms. Symptomatology could be used as a clinical tool to determine the need for further investigation.

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