Glycaemic Impact of the Pre-Exercise Timing of an Elevated Glucose Target Implemented Using an Automated Insulin Delivery System in Adults with Type 1 Diabetes

Aim: Pre-exercise recommendations for people with type 1 diabetes (T1D) using automated insulin delivery often involve planning exercise well in advance, such as setting a temporary elevated glucose target (TT) 1-2h pre-exercise. This study compares glucose control in adults with T1D using AID when a TT is set closer to exercise.

Methods: Twenty-six participants using the Medtronic MiniMedTM 780G system performed 16 exercise bouts in random order: 12 afternoon bouts (four 40min and four 90min moderate intensity exercise [MIE] and four 40min high intensity interval exercise [HIE]) and four morning bouts of 40min MIE, with a TT set 60min (TT60), 20min (TT20), 0min (TT0) or no TT (TTnil) pre-exercise. Oral carbohydrate was consumed pre-exercise for glucose <5.6mmol/L and during exercise for sensor glucose <3.9mmol/L or symptomatic hypoglycaemia confirmed by fingerprick blood glucose. The primary outcome was time below range (TBR; <3.9mmol/L) from exercise commencement to 2h post-exercise.

Results: TBR was 0% from exercise commencement to 120 minutes post-exercise for all conditions with no difference between TT conditions. Insulin delivery in the 2h pre-exercise was higher for TTnil compared to TT60 (1.3 [0.9, 2.4] Units vs 2.0 [1.1, 3.0] Units; p=0.013), however there was no difference between TT conditions for starting glucose, TIR or for number of participants who experienced a hypoglycaemia episode from exercise commencement to 2h post-exercise.

Conclusion: Glycaemia with exercise was excellent regardless of TT timing, which had minimal impact on glycaemic outcomes during and post-exercise in a well-controlled cohort in the absence of a recent meal. While implementation of a TT 60min pre-exercise as currently recommended has an impact on insulin delivery pre-exercise, the glycaemic benefits are minor and this recommendation could be liberalised in some cases.

(ADC TEMPLATE)

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