Managing insulin and carbohydrate needs for an endurance cyclist

The management of type 1 diabetes while performing high intensity and long duration exercise is challenging, as the prevention of hypoglycaemia and hyperglycaemia is essential to optimise performance. To achieve this, a fine balance between carbohydrate intake and insulin dose is required.

A 28-year-old man with type 1 diabetes was referred to the diabetes specialist team for advice regarding carbohydrate and insulin requirements during prolonged and intensive exercise as he planned to cycle 900 miles over nine consecutive days.

At the initial consultation, his self-reported blood glucose levels (BGL) fluctuated from <4mmol/L to >20mmol/L. The most recent HbA1c was 73mmol/mol (8.8%). Prior to attending the clinic, in order to prevent hypoglycaemia while cycling, he was consuming large quantities of fast acting glucose (>80g) during races and training sessions that resulted in hyperglycaemia.

During the consultation, it was agreed that he should aim for a target BGL at the beginning of the ride of 12mmol/L and to finish the ride between 5–9mmol/L. In order to maintain the BGL within the target range, he was advised to consume 20g fast acting carbohydrate every 20 minutes in the form of liquid, gels or glucose tablets. He was also advised to consume complex carbohydrate dense meals throughout the day in order to help provide a steady energy release.

Guided by self-monitored blood glucose results collected during practice cycles, on ride days he also reduced the basal insulin by approximately 17–20% and bolus doses by 60% (breakfast), 50% (lunch) and 10% (evening meal).

This case illustrates that marked reductions in both basal and bolus insulin may be required to reduce the risk of hypoglycaemia during and after high intensity and long duration exercise. Given the metabolic demands placed on the cyclist, a regular intake of 20g fast acting carbohydrate intake may also help stabilise blood glucose level concentration during intensive exercise.

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Reference