Short-term nocturnal hypoglycaemia increases morning food intake in healthy humans

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AIMS: Hypoglycaemia during wakefulness increases hunger and food intake. Patients with Type 1 diabetes mellitus are at high risk of recurrent hypoglycaemia and weight gain. Given the background of frequent hypoglycaemic episodes during night-time sleep in diabetic patients, we investigated morning food intake after nocturnal hypoglycaemia. METHODS: We tested 16 healthy normal-weight subjects (eight women) on three nights. A linear fall in plasma glucose to a nadir of 2.2 mmol/l within 60 min was induced by insulin infusion immediately after sleep onset ('early hypo') or after about 3.5 h of sleep ('late hypo'). On a control night, no hypoglycaemia was induced. Spontaneous food intake at a breakfast buffet was registered on the subsequent morning. RESULTS: Compared with the control condition (700 +/- 93 kcal), subjects ate more after 'late hypo' (867 +/- 108 kcal; P = 0.041), but not after 'early hypo' (852 +/- 111 kcal; P = 0.130). Analyses of macronutrient fractions revealed that in comparison with the control condition, subjects ate significantly more carbohydrates after both 'late hypo' (277 +/- 25 kcal vs. 206 +/- 23 kcal, P < 0.001) and 'early hypo' (245 +/- 23 kcal, P = 0.048), with this effect being more pronounced after late than early nocturnal hypoglycaemia (P = 0.026). CONCLUSIONS: In healthy subjects, nocturnal hypoglycaemia during sleep stimulates spontaneous food intake the following morning, with carbohydrate intake being especially affected. Effects were more pronounced after 'late hypo', suggesting the influence of temporal dynamics. Although healthy non-diabetic subjects were studied, similar mechanisms may contribute to the frequently observed body weight gain in insulin-treated diabetic patients.

type: journal paper/review (English)
date of publishing: 2-2008
journal title: Diabetic medicine : a journal of the British Diabetic Association (25/2)
ISSN electronic: 1464-5491
pages: 232-5