

Effects of liraglutide treatment in genetic obesity

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Background: Obesity is associated with numerous comorbidities, like metabolic syndrome and type 2 diabetes (T2D). In rare cases, obesity is caused by disruptions in the leptin-melanocortin pathway, e.g. melanocortin 4 receptor (MC4R). In these patients, little effect of lifestyle treatment is seen. Moreover, bariatric surgery seems less successful. Liraglutide is a Glucagon-Like-Peptide-1 agonist, primarily developed for the treatment of T2D, showing positive effects on metabolic parameters and weight loss in lifestyle-induced obesity. We present a case report of the results of liraglutide treatment in a patient with a MC4R mutation.

Case presentation

A 29 year old female patient developed hyperphagia and progressive obesity at the age of 5. At the age of 13 a heterozygous pathogenic variant in MC4R was identified. Intensive supportive lifestyle treatment had little effect. At the age of 29, liraglutide treatment was initiated because of her therapy-resistant obesity. She had a weight of 188,7 kg, BMI of 57.09 kg/m² and weight circumference of 129 cm. Her resting energy expenditure (REE) was 34% lower than expected (1738 kcal/day). Laboratory tests showed increased fasting glucose (6.4 mmol/l), dyslipidaemia, and leptin resistance.

Results: Alongside intensive supportive lifestyle treatment, liraglutide was initiated and dosing could be titrated towards 3.0 mg. After 16 weeks, her weight, BMI and weight circumference respectively decreased to 179,2 kg, 54.22 kg/m² and 128 cm. Her REE was 27% higher than expected (3453 kcal/day). Laboratory testing showed a normalised fasting glucose (5.4 mmol/l), improved dyslipidaemia, and decreased leptin levels. She reported improved satiety feelings and no serious side effects.

Discussion: We show beneficial effects of liraglutide on metabolic parameters, weight, and satiety in a patient with a pathogenic MC4R mutation. Even in a period with limited intensive physical activities during Corona lockdown, this patient achieved a clinically relevant 5% weight loss. Our findings suggests that liraglutide might be an effective treatment option, as an adjunct to a healthy lifestyle, for patients with monogenic obesity.