Comparison of treatment with insulin degludec and glargine U100 in patients with type 1 diabetes prone to nocturnal severe hypoglycaemia: The HypoDeg randomised, controlled, open-label, cross-over trial

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Abstract

Aims/hypothesis Nocturnal hypoglycaemia remains a main limiting factor for achieving good glycaemic control in type 1 diabetes. The long-acting insulin analogue degludec reduces the risk of nocturnal hypoglycaemia in patients with type 1 diabetes at low risk of such events. This study investigates whether insulin degludec in comparison with insulin glargine U100 reduces the risk of nocturnal and severe hypoglycaemia in patients prone to nocturnal severe hypoglycaemia.

Methods Adults with type 1 diabetes and at least one episode of nocturnal severe hypoglycaemia during the preceding two years were included in a two-year prospective, randomised, open, multicentre, balanced cross-over trial. A total of 149 patients were randomised 1:1 to basal-bolus therapy with insulin degludec and insulin aspart or insulin glargine U100 and insulin aspart (73 to receive insulin degludec first, and 76 to receive insulin glargine U100 first). The treatment periods were one year long and consisted of 3 months of run-in or cross-over followed by nine months of maintenance before crossing over to the other treatment arm. Endpoints were assessed during the last nine months in each treatment arm. The primary endpoint was number of nocturnal (00:00 to 05:59) symptomatic hypoglycaemic episodes. One of the secondary endpoints was the occurrence of severe hypoglycaemia. All endpoints were recorded during the maintenance periods and adjudicated blindly and analysed by intention-to-treat.

Results Treatment with insulin degludec resulted in a 28% (95%CI: 9-43; p=0.02) relative rate reduction (RRR) of nocturnal symptomatic hypoglycaemia at level 1 (≤3.9 mmol/L), a 37% (95%CI: 16-53; p=0.002) RRR at level 2 (≤3.0 mmol/l), and a 35% (95%CI: 1-58; p=0.04) RRR in all-day severe hypoglycaemia compared to insulin glargine U100.

Conclusions/interpretation Patients with type 1 diabetes prone to nocturnal severe hypoglycaemia have lower rates of nocturnal symptomatic hypoglycaemia and of all-day severe hypoglycaemia with insulin degludec as compared with insulin glargine U100.

Registration

This clinical trial is registered at www.clinicaltrials.gov (# NCT02192450).

Keywords

Clinical diabetes

Clinical science

Human

Hypoglycaemia

Insulin therapy