Adjustment of insulin Degludec to Reduce post-Exercise (nocturnal) hypoglycaeMia in people with diabetes - the ADREM study

Published: 10-12-2019
Last updated: 17-01-2025

To examine the effect of two different degludec dose adjustments on glucose profiles and the incidence of (nocturnal) hypoglycaemia after oxidative exercise in people with DM1 at elevated risk of hypoglycaemia.

Ethical review	Approved WMO
Status	Completed
Health condition type	Glucose metabolism disorders (incl diabetes mellitus)
Study type	Interventional

Summary

ID

NL-OMON48464

Source
ToetsingOnline

Brief title
ADREM

Condition

- Glucose metabolism disorders (incl diabetes mellitus)

Synonym
Type 1 diabetes mellitus (lekenterm idem)

Research involving
Human

Sponsors and support

Primary sponsor: Afdeling Interne Geneeskunde

Source(s) of monetary or material Support: Novo Nordisk

Intervention

Keyword: Exercise, Hypoglycaemia, iIsulin Degludec, Type 1 diabetes mellitus

Outcome measures

Primary outcome

Time spent in hypoglycaemic range (i.e. glucose <= 3.8 mmol/l) during the night (00:00 to 05:59h) following the exercise day measured by CGM

Secondary outcome

- Time spent in nocturnal hyperglycaemia
- Number of nocturnal hypoglycaemic events
- Number of serious hypoglycaemic events (in the 6 days following exercise)
- Number of severe hypoglycaemic events (in the 14 days following exercise)
- Total number of hypoglycaemic events (in the 6 days following exercise)
- Proportion of patients with at least 1 nocturnal hypoglycaemic event
- Proportion of patients with at least 1 serious hypoglycaemic event (in the 6 days following exercise)
- Proportion of patients with at least 1 severe hypoglycaemic event (in the 14 days following exercise)
- Proportion of patients with at least 1 hypoglycaemic event (in the 6 days following exercise)
- Time spent in hypoglycaemia (in the 6 days following exercise)
- Time spent in serious hypoglycaemia (in the 6 days following exercise)
- Time in range (TIR, in the 6 days following exercise)
- Time spent in hyperglycaemia (in the 6 days following exercise)

- Next day fasting glucose

- Next day fasting ketones

- 7-point glucose profiles (in the 6 days following exercise)

- 24 and 48 hour glucose profiles

- Carbohydrate intake after exercise and the day following exercise

Study description

Background summary

It is common practice for people with type 1 diabetes mellitus (DM1) to reduce the dose of long-acting insulin at bedtime after exercise to reduce the risk of subsequent nocturnal hypoglycaemia . The new long-acting insulin analogue insulin degludec has a flatter and more stable glucose-lowering profile than conventional long-acting insulin, in large part due to the much longer half-life of > 24 hours (twice as long as conventional insulin). It is not known whether or not dosing adjustments for insulin degludec are to be recommended after exercise to reduce the risk of nocturnal hypoglycaemia.

Study objective

To examine the effect of two different degludec dose adjustments on glucose profiles and the incidence of (nocturnal) hypoglycaemia after oxidative exercise in people with DM1 at elevated risk of hypoglycaemia.

Study design

Randomised controlled cross-over intervention study

Intervention

Randomised cross-over treatment with three degludec dosing regimens (1. No adjustment of the degludec dose (control), 2. Reducing the dose of degludec by 40%, 3. Postponing the administration of degludec for 8 hours and reducing the dose by 20%) after a 45-min exercise test on a bicycle ergometer followed by blinded continuous glucose monitoring (CGM) during 6 days.

Study burden and risks

The study participants will not benefit directly from participation in this clinical trial. Participants will visit the hospital for a screening visit, 3 long visits (6 hours) with an exercise test and 1 short visit (30 min). The duration of the entire trial per patient is 10 weeks. Insulin degludec has a generally favourable safety profile. In total 15 blood samples will be taken. The total blood volume taken will be approximately 250 ml. During the screening and the long visits an intravenous cannula will be inserted to limit the number of venous punctures.

Contacts

Public
Selecteer

Geert Grooteplein-Zuid 10
Nijmegen 6525 GA
NL
Scientific
Selecteer

Geert Grooteplein-Zuid 10
Nijmegen 6525 GA
NL

Trial sites

Listed location countries

Netherlands

Eligibility criteria

Age
Adults (18-64 years)
Elderly (65 years and older)

Inclusion criteria

- Adults with type 1 diabetes mellitus, 18-60 years
- Diabetes duration at least two years

• Treatment with long-acting insulin in combination with short-acting insulin analogue, according to basal-bolus regimen for at least one year
• Stable glycaemic control with HbA1c <=75 mmol/mol (9%)
• At least one severe hypoglycaemia in the past year and/or >=2 points on Dutch modified version of Clarke score or >=3 points on Gold score
• Regularly engaging in exercise of moderate intensity or more (at least one hour per week)

Exclusion criteria

• Microvascular complications, except background retinopathy or microalbuminuria
• History of cardiovascular disease, including heart failure, symptomatic cardiac valve disease and treatment-requiring arrhythmia
• Use of drugs affecting glucose metabolism other than insulin or metformin
• BMI >30 kg/m2
• Blood pressure >160/90 mmHg or use of blood pressure lowering drugs
• Pregnancy or the wish to become pregnant
• MDRD-GFR <60 ml/min/1.73 m2

Study design

Design

Study phase:	4
Study type:	Interventional
Intervention model:	Crossover
Allocation:	Randomized controlled trial
Masking:	Open (masking not used)
Control:	Active
Primary purpose:	Treatment

Recruitment

NL

Recruitment status:	Completed
Start date (anticipated):	22-09-2020
Enrollment:	18
Type:	Actual

Medical products/devices used

Product type:	Medicine
Brand name:	Tresiba
Generic name:	Insulin Degludec
Registration:	Yes - NL intended use

Ethics review

Approved WMO Date:	10-12-2019
Application type:	First submission
Review commission:	CMO regio Arnhem-Nijmegen (Nijmegen)
Approved WMO Date:	13-02-2020
Application type:	First submission
Review commission:	CMO regio Arnhem-Nijmegen (Nijmegen)
Approved WMO Date:	08-06-2020
Application type:	Amendment
Review commission:	CMO regio Arnhem-Nijmegen (Nijmegen)
Approved WMO Date:	10-08-2020
Application type:	Amendment
Review commission:	CMO regio Arnhem-Nijmegen (Nijmegen)
Approved WMO Date:	21-10-2020
Application type:	Amendment
Review commission:	CMO regio Arnhem-Nijmegen (Nijmegen)

Study registrations

Followed up by the following (possibly more current) registration

No registrations found.

Other (possibly less up-to-date) registrations in this register

No registrations found.

In other registers

Register	ID
EudraCT	EUCTR2019-004222-22-NL
CCMO	NL71903.091.19

Study results

Date completed: 02-09-2021

Results posted: 16-03-2023

First publication
01-01-1900