Clinical trial results:
In vivo molecular imaging of angiogenesis in type 2 diabetes

Summary

EudraCT number	2019-003466-41
Trial protocol	DK
Global end of trial date	06 October 2020

Results information

Result version number	v1 (current)
This version publication date	01 March 2022
First version publication date	01 March 2022

Trial information

Trial identification

Sponsor protocol code	AK2019-10

Additional study identifiers

ISRCTN number	-
ClinicalTrials.gov id (NCT number)	-
WHO universal trial number (UTN)	-

Notes:

Sponsors

Sponsor organisation name	Rigshospitalet
Sponsor organisation address	Blegdamsvej 9, Copenhagen, Denmark, 2100
Public contact	Dr Rasmus Ripa, Rigshospitalet, Department of Clinical Physiology, Nuclear Medicine and PET, rasmus.ripa@regionh.dk
Scientific contact	Dr Rasmus Ripa, Rigshospitalet, Department of Clinical Physiology, Nuclear Medicine and PET, rasmus.ripa@regionh.dk

Notes:

Paediatric regulatory details

Is trial part of an agreed paediatric investigation plan (PIP)	No
Does article 45 of REGULATION (EC) No 1901/2006 apply to this trial?	No
Does article 46 of REGULATION (EC) No 1901/2006 apply to this trial?	No

Notes:

Results analysis stage

Analysis stage	Final
Date of interim/final analysis	15 November 2021
Is this the analysis of the primary completion data?	Yes
Primary completion date	06 October 2020
Global end of trial reached?	Yes
Global end of trial date	06 October 2020
Was the trial ended prematurely?	Yes

Notes:

General information about the trial

Main objective of the trial:

To use 68Ga-NODAGA-E[c(RGDyK)]2 PET/CT scans as a tool to image myocardial angiogenesis in persons with type 2 diabetes compares to controls without diabetes.

Protection of trial subjects:

The study investigated a new i.v. radiotracer for detecting angiogenesis. There were no discomfort or pain associated with the study of the new tracer.

Background therapy: -

Evidence for comparator: -

Actual start date of recruitment	23 January 2020
Long term follow-up planned	No
Independent data monitoring committee (IDMC) involvement?	No

Notes:

Population of trial subjects

Subjects enrolled per country

Country: Number of subjects enrolled	Denmark: 30
Worldwide total number of subjects	30
EEA total number of subjects	30

Notes:

Subjects enrolled per age group

In utero	0
Preterm newborn - gestational age < 37 wk	0
Newborns (0-27 days)	0
Infants and toddlers (28 days-23 months)	0
Children (2-11 years)	0
Adolescents (12-17 years)	0
Adults (18-64 years)	6
From 65 to 84 years	24
85 years and over	0

Subject disposition

Recruitment

Recruitment details:

The study population was recruited as a sub-group from the Rubin 2 (DOI: 10.1111/dme.14517) at a single center in Copenhagen, Denmark from January 23rd 2020 until October 5th 2020.

Pre-assignment

Screening details:

48 persons, 29 with type 2 diabetes and 19 controls participated included in the Rubin 2 study (DOI: 10.1111/dme.14517) was screened for inclusion. All 48 screened persons were eligible for inclusion. However due to the Covid19 pandemic, inclusion had to be terminated in October 2020 after inclusion of 30 participants.

Period 1

Period 1 title	Overall period (overall period)
Is this the baseline period?	Yes
Allocation method	Non-randomised - controlled
Blinding used	Not blinded

Arms

Are arms mutually exclusive?	Yes
Arm title	Type 2 diabetes

Arm description:

The type 2 diabetes was PET/CT scanned with RGD-PET at one time-point

Arm type	Experimental
Investigational medicinal product name	68Ga-NODAGA-E[c(RGDyK)]2
Investigational medicinal product code	
Other name	
Pharmaceutical forms	Solution for injection/infusion
Routes of administration	Intravenous use

Dosage and administration details:

At the scan the patient were injected with ~200 MBq of 68Ga-NODAGA-E[c(RGDyK)]2

Arm title	Non-diabetic controls

Arm description:

The non-diabetic controls arm was PET/CT scanned with RGD-PET at one time-point.

Arm type	Experimental
Investigational medicinal product name	68Ga-NODAGA-E[c(RGDyK)]2
Investigational medicinal product code	
Other name	
Pharmaceutical forms	Solution for injection/infusion
Routes of administration	Intravenous use

Dosage and administration details:

At the scan the patient were injected with ~200 MBq of 68Ga-NODAGA-E[c(RGDyK)]2

Number of subjects in period 1	Type 2 diabetes	Non-diabetic controls
Started	20	10
Completed	20	10

Baseline characteristics

Reporting groups	
Reporting group title	Type 2 diabetes
Reporting group description:	
The type 2 diabetes was PET/CT scanned with RGD-PET at one time-point	
Reporting group title	Non-diabetic controls
Reporting group description:	
The non-diabetic controls arm was PET/CT scanned with RGD-PET at one time-point.	

Reporting group values	Type 2 diabetes	Non-diabetic controls	Total
Number of subjects	20	10	30
Age categorical Units: Subjects			
In utero			0
Preterm newborn infants (gestational age < 37 wks)			0
Newborns (0-27 days)			0
Infants and toddlers (28 days-23 months)			0
Children (2-11 years)			0
Adolescents (12-17 years)			0
Adults (18-64 years)			0
From 65-84 years			0
85 years and over			0
Age continuous Units: years			
arithmetic mean	61	62	
standard deviation	± 9	± 8	-
Gender categorical Units: Subjects			
Female	6	4	10
Male	14	6	20

End points

End points reporting groups

Reporting group title	Type 2 diabetes
Reporting group description: The type 2 diabetes was PET/CT scanned with RGD-PET at one time-point	
Reporting group title	Non-diabetic controls
Reporting group description: The non-diabetic controls arm was PET/CT scanned with RGD-PET at one time-point.	

Primary: Cardiac 68Ga-RGD uptake in type 2 diabetes and non-diabetic controls

End point title	Cardiac 68Ga-RGD uptake in type 2 diabetes and non-diabetic controls
End point description:	
End point type	Primary
End point timeframe: cross section	

End point values	Type 2 diabetes	Non-diabetic controls		
Subject group type	Reporting group	Reporting group		
Number of subjects analysed	20	10		
Units: SUV				
arithmetic mean (standard deviation)	1.18 (± 0.15)	1.18 (± 0.11)		

Statistical analyses

Statistical analysis title	Primary endpoint
Comparison groups	Type 2 diabetes v Non-diabetic controls
Number of subjects included in analysis	30
Analysis specification	Pre-specified
Analysis type	superiority[1]
P-value	= 0.99
Method	t-test, 2-sided

Notes:

[1] - We applied the Student’s t-tests for continuous variables to analyse differences in RGD uptake between the participants with type 2 diabetes and the non-diabetic controls.

Adverse events

Adverse events information	
Timeframe for reporting adverse events:	
All participants were monitored 24 hours after injection of the radiotracer for adverse eventa.	
Assessment type	Systematic

Dictionary used	
Dictionary name	MedDRA
Dictionary version	10

Reporting groups	
Reporting group title	Type 2 diabetes
Reporting group description:	
The type 2 diabetes was PET/CT scanned with RGD-PET at one time-point	
Reporting group title	Non-diabetic controls
Reporting group description:	
The non-diabetic controls arm was PET/CT scanned with RGD-PET at one time-point.	

Serious adverse events	Type 2 diabetes	Non-diabetic controls	
Total subjects affected by serious adverse events			
subjects affected / exposed	0 / 20 (0.00%)	0 / 10 (0.00%)	
number of deaths (all causes)	0	0	
number of deaths resulting from adverse events	0	0	

Frequency threshold for reporting non-serious adverse events: 0 %

Non-serious adverse events	Type 2 diabetes	Non-diabetic controls	
Total subjects affected by non-serious adverse events			
subjects affected / exposed	1 / 20 (5.00%)	0 / 10 (0.00%)	
Gastrointestinal disorders			
Appetite disorder	Additional description: few days with decreased appetite and insomnia		
subjects affected / exposed	1 / 20 (5.00%)	0 / 10 (0.00%)	
occurrences (all)	1	0	
Renal and urinary disorders			
Infection	Additional description: Participant reports self limiting dark color urine and febrilia.		
subjects affected / exposed	1 / 20 (5.00%)	0 / 10 (0.00%)	
occurrences (all)	1	0	

More information

Substantial protocol amendments (globally)

Were there any global substantial amendments to the protocol? No

Interruptions (globally)

Were there any global interruptions to the trial? No

Limitations and caveats

Limitations of the trial such as small numbers of subjects analysed or technical problems leading to unreliable data.

The study was planned to include all participants in the re-examination who gave consent to this sub-study, however due to the Covid19 pandemic, inclusion had to be terminated in October 2020 after inclusion of 30 participants.

Notes: