Clinical trial results:
The effects of SGLT2-inhibition in patients with type 2 diabetes and chronic kidney disease on renal hemodynamics, kidney function and vasoactive hormones

Summary

EudraCT number	2019-004447-80
Trial protocol	DK
Global end of trial date	03 January 2023

Results information

Result version number	v1 (current)
This version publication date	22 February 2025
First version publication date	22 February 2025

Trial information

Trial identification

Sponsor protocol code	SFN-2-2019

Additional study identifiers

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

Notes:

Sponsors

Sponsor organisation name	University Clinic of Nephrology and Hypertension, Regional Hospital Holstebro
Sponsor organisation address	Hospitalparken 15 , Herning, Denmark, 7400
Public contact	Steffen Flindt Nielsen, University Clinic of Nephrology and Hypertension, Regional Hospital Holstebro, 0045 78436588, steffen.nielsen@midt.rm.dk
Scientific contact	Steffen Flindt Nielsen, University Clinic of Nephrology and Hypertension, Regional Hospital Holstebro, 0045 78436588, steffen.nielsen@midt.rm.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	03 January 2023
Is this the analysis of the primary completion data?	Yes
Primary completion date	03 January 2023
Global end of trial reached?	Yes
Global end of trial date	03 January 2023
Was the trial ended prematurely?	No

Notes:

General information about the trial

Main objective of the trial:

To examine the effects of SGLT2-inhibition versus placebo on renal hemodynamics in patients with type 2 diabetes and chronic kidney disease

Protection of trial subjects:

NA

Background therapy: -

Evidence for comparator: -

Actual start date of recruitment	01 March 2021
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: 19
Worldwide total number of subjects	19
EEA total number of subjects	19

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)	5
From 65 to 84 years	14
85 years and over	0

Subject disposition

Recruitment	
Recruitment details: -	
Pre-assignment	
Screening details: -	
Pre-assignment period milestones	
Number of subjects started	19
Number of subjects completed	19

Period 1	
Period 1 title	Placebo
Is this the baseline period?	Yes
Allocation method	Randomised - controlled
Blinding used	Double blind
Roles blinded	Subject, Investigator, Monitor, Data analyst, Carer
Arms	
Arm title	Placebo
Arm description: -	
Arm type	Placebo
Investigational medicinal product name	Placebo
Investigational medicinal product code	
Other name	
Pharmaceutical forms	Tablet
Routes of administration	Oral use

Dosage and administration details:

1 tablet x 1 day

Number of subjects in period 1	Placebo
Started	19
Completed	17
Not completed	2
Consent withdrawn by subject	1
Non-compliance	1

Period 2	
Period 2 title	Empaglilfozin
Is this the baseline period?	No
Allocation method	Randomised - controlled
Blinding used	Double blind
Roles blinded	Subject, Investigator, Monitor, Data analyst, Carer, Assessor

Arms

Arm title	Empagliflozin
Arm description: -	
Arm type	Active comparator
Investigational medicinal product name	Empagliflozin
Investigational medicinal product code	
Other name	
Pharmaceutical forms	Tablet
Routes of administration	Oral use

Dosage and administration details:

10 mg x 1 daily

Number of subjects in period 2	Empagliflozin
Started	17
Completed	17

Baseline characteristics

Reporting groups	
Reporting group title	Placebo

Reporting group description: -

Reporting group values	Placebo	Total	
Number of subjects	19	19	
Age categorical Units: Subjects			
Age continuous Units: years arithmetic mean standard deviation	 71.2 ± 5.2	 -	
Gender categorical Units: Subjects			
Female	1	1	
Male	18	18	

End points

End points reporting groups	
Reporting group title	Placebo
Reporting group description: -	
Reporting group title	Empagliflozin
Reporting group description: -	

Primary: Renal Blood Flow	
End point title	Renal Blood Flow
End point description:	
End point type	Primary
End point timeframe:	
at the end of each period	

End point values	Placebo	Empagliflozin		
Subject group type	Reporting group	Reporting group		
Number of subjects analysed	16	16		
Units: ml/min/ccm				
geometric mean (inter-quartile range (Q1-Q3))	1.04 (0.89 to 1.15)	0.98 (0.82 to 1.17)		

Statistical analyses

Statistical analysis title	paired t-test
Comparison groups	Placebo v Empagliflozin
Number of subjects included in analysis	32
Analysis specification	Pre-specified
Analysis type	superiority
P-value	< 0.001
Method	t-test, 2-sided

Secondary: GFR	
End point title	GFR
End point description:	
End point type	Secondary
End point timeframe:	
at the end of each period	

End point values	Placebo	Empagliflozin		
Subject group type	Reporting group	Reporting group		
Number of subjects analysed	17	17		
Units: ml/min/1.73m2				
geometric mean (inter-quartile range (Q1-Q3))	41.3 (38.4 to 49.0)	37.7 (32.9 to 46.8)		

Statistical analyses

Statistical analysis title	paired t-test
Comparison groups	Empagliflozin v Placebo
Number of subjects included in analysis	34
Analysis specification	Pre-specified
Analysis type	superiority
P-value	= 0.019
Method	t-test, 2-sided

Secondary: RVR

End point title	RVR

End point description:

End point type	Secondary

End point timeframe:

at the end of each period

End point values	Placebo	Empagliflozin		
Subject group type	Reporting group	Reporting group		
Number of subjects analysed	17	17		
Units: mmHg/ml/min				
geometric mean (inter-quartile range (Q1-Q3))	0.37 (0.27 to 0.45)	0.38 (0.30 to 0.44)		

Statistical analyses

Statistical analysis title	paired t-test
Comparison groups	Placebo v Empagliflozin

Number of subjects included in analysis	34
Analysis specification	Pre-specified
Analysis type	superiority
P-value	= 0.6
Method	t-test, 2-sided

Secondary: Systolic blood pressure

End point title	Systolic blood pressure

End point description:

End point type	Secondary

End point timeframe:
at the end of each period

End point values	Placebo	Empagliflozin		
Subject group type	Reporting group	Reporting group		
Number of subjects analysed	17	17		
Units: mmHg				
arithmetic mean (standard deviation)	140 (± 15)	132 (± 12)		

Statistical analyses

Statistical analysis title	paired t-test
Comparison groups	Placebo v Empagliflozin
Number of subjects included in analysis	34
Analysis specification	Pre-specified
Analysis type	superiority
P-value	= 0.0097
Method	t-test, 2-sided

Secondary: diastolic blood pressure

End point title	diastolic blood pressure

End point description:

End point type	Secondary

End point timeframe:
at the end of each period

End point values	Placebo	Empagliflozin		
Subject group type	Reporting group	Reporting group		
Number of subjects analysed	17	17		
Units: mmHg				
arithmetic mean (standard deviation)	80 (± 9)	76 (± 7)		

Statistical analyses

Statistical analysis title	paired t-test
Comparison groups	Placebo v Empagliflozin
Number of subjects included in analysis	34
Analysis specification	Pre-specified
Analysis type	superiority
P-value	= 0.043
Method	t-test, 2-sided

Secondary: TVR

End point title	TVR

End point description:

End point type	Secondary

End point timeframe:
at the end of each period

End point values	Placebo	Empagliflozin		
Subject group type	Reporting group	Reporting group		
Number of subjects analysed	17	17		
Units: dyn/s/m5				
arithmetic mean (standard deviation)	1909 (± 280)	1827 (± 246)		

Statistical analyses

Statistical analysis title	paired t-test
Comparison groups	Empagliflozin v Placebo
Number of subjects included in analysis	34
Analysis specification	Pre-specified
Analysis type	superiority
P-value	= 0.02
Method	t-test, 2-sided

Secondary: heart rate

End point title	heart rate

End point description:

End point type	Secondary

End point timeframe:
at the end of each period

End point values	Placebo	Empagliflozin		
Subject group type	Reporting group	Reporting group		
Number of subjects analysed	17	17		
Units: min-1				
median (standard deviation)	64 (± 10)	63 (± 10)		

Statistical analyses

Statistical analysis title	paired t-test
Comparison groups	Placebo v Empagliflozin
Number of subjects included in analysis	34
Analysis specification	Pre-specified
Analysis type	superiority
P-value	= 0.15
Method	t-test, 2-sided

Adverse events

Adverse events information	
Timeframe for reporting adverse events: From the begining of the trial to LPLV + 1 week	
Assessment type	Systematic

Dictionary used	
Dictionary name	MedDRA
Dictionary version	21

Reporting groups	
Reporting group title	total trial

Reporting group description: -

Serious adverse events	total trial		
Total subjects affected by serious adverse events			
subjects affected / exposed	0 / 19 (0.00%)		
number of deaths (all causes)	0		
number of deaths resulting from adverse events			

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

Non-serious adverse events	total trial		
Total subjects affected by non-serious adverse events			
subjects affected / exposed	10 / 19 (52.63%)		
General disorders and administration site conditions			
Fatigue			
subjects affected / exposed	1 / 19 (5.26%)		
occurrences (all)	1		
Intertrigo			
subjects affected / exposed	1 / 19 (5.26%)		
occurrences (all)	1		
Dizziness			
subjects affected / exposed	1 / 19 (5.26%)		
occurrences (all)	1		
Urogenital disorder	Additional description: Increased urinary urge		

subjects affected / exposed	1 / 19 (5.26%)		
occurrences (all)	1		
Eye disorders			
blurred vision			
subjects affected / exposed	1 / 19 (5.26%)		
occurrences (all)	1		
Endocrine disorders			
Hypoglycaemia			
subjects affected / exposed	1 / 19 (5.26%)		
occurrences (all)	2		
Musculoskeletal and connective tissue disorders			
Contusion	Additional description: contusion of knee		
subjects affected / exposed	1 / 19 (5.26%)		
occurrences (all)	1		
Amputation	Additional description: amputation of toe due to preexisting chronic ulcer		
subjects affected / exposed	1 / 19 (5.26%)		
occurrences (all)	1		
Muscle discomfort			
subjects affected / exposed	3 / 19 (15.79%)		
occurrences (all)	3		
Infections and infestations			
Upper respiratory tract infection			
subjects affected / exposed	2 / 19 (10.53%)		
occurrences (all)	2		
Pneumonia			
subjects affected / exposed	1 / 19 (5.26%)		
occurrences (all)	1		

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

None reported