



## 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
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##### 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:

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**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:

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**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:

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**Population of trial subjects**

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**Subjects enrolled per country**

Country: Number of subjects enrolled	Denmark: 19
Worldwide total number of subjects	19
EEA total number of subjects	19

Notes:

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

**Arms**

<b>Arm title</b>	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

<b>Number of subjects in period 2</b>	Empagliflozin
Started	17
Completed	17

## Baseline characteristics

### Reporting groups

Reporting group title	Placebo
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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	

<b>End point values</b>	Placebo	Empagliflozin		
Subject group type	Reporting group	Reporting group		
Number of subjects analysed	17	17		
Units: ml/min/1.73m <sup>2</sup>				
geometric mean (inter-quartile range (Q1-Q3))	41.3 (38.4 to 49.0)	37.7 (32.9 to 46.8)		

### Statistical analyses

<b>Statistical analysis title</b>	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	

<b>End point values</b>	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

<b>Statistical analysis title</b>	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

<b>Statistical analysis title</b>	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

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**Secondary: heart rate**

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End point title	heart rate
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End point description:

End point type	Secondary
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End point timeframe:

at the end of each period

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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 beginning of the trial to LPLV + 1 week

Assessment type	Systematic
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### Dictionary used

Dictionary name	MedDRA
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Dictionary version	21
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### Reporting groups

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

## More information

### Substantial protocol amendments (globally)

Were there any global substantial amendments to the protocol? No

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### Interruptions (globally)

Were there any global interruptions to the trial? No

### Limitations and caveats

None reported