# EU Clinical Trials Register

## Clinical trial results:
## SOdium-glucose CO-transporter inhibition in patients with newly detected Glucose Abnormalities post Myocardial Infarction (SOCOGAMI)

### Summary

| | |
|---|---|
| EudraCT number | 2015-004571-73 |
| Trial protocol | SE |
| Global end of trial date | 25 November 2020 |

### Results information

| | |
|---|---|
| Result version number | v1 (current) |
| This version publication date | 27 April 2023 |
| First version publication date | 27 April 2023 |

### Trial information

#### Trial identification

| | |
|---|---|
| Sponsor protocol code | SOCOGAMI |

#### Additional study identifiers

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

Notes:

#### Sponsors

| | |
|---|---|
| Sponsor organisation name | Karolinska Institutet |
| Sponsor organisation address | Nobels väg 6, Stockholm, Sweden, 17177 |
| Public contact | Lars Rydén, Karolinska Institutet Department of Medicine Solna, Cardiology Unit, +46 8-517 721 71, lars.ryden@ki.se |
| Scientific contact | Lars Rydén, Karolinska Institutet Department of Medicine Solna, Cardiology Unit, +46 8-517 721 71, lars.ryden@ki.se |

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 | 01 November 2022 |
| Is this the analysis of the primary completion data? | Yes |
| Primary completion date | 25 November 2020 |
| Global end of trial reached? | Yes |
| Global end of trial date | 25 November 2020 |
| Was the trial ended prematurely? | No |

Notes:

## General information about the trial

Main objective of the trial:

To test the hypotheses that Empagliflozin (Jardiance®) will have a beneficial effect on myocardial function and structure, glucose homeostasis and beta cell function in patients with recent myocardial infarction or unstable angina pectoris and newly detected impaired glucose tolerance or type 2 diabetes.

Protection of trial subjects:

All patients signed consent to study participation following written and oral information. The trial was carried out in compliance with principles in the Declaration of Helsinki, 1996 version, in accordance with the ICH Harmonized Tripartite Guideline for Good Clinical Practice (GCP) and in accordance with applicable regulatory requirements. The protocol was approved by the Regional Ethics committee in Stockholm (Dnr 2015:4/11).

Background therapy: -

Evidence for comparator: -

| | |
|---|---|
| Actual start date of recruitment | 02 June 2016 |
| 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 | Sweden: 42 |
| Worldwide total number of subjects | 42 |
| EEA total number of subjects | 42 |

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) | 11 |
| From 65 to 84 years | 31 |

| 85 years and over | 0 |
| --- | --- |

## Subject disposition

### Recruitment

Recruitment details:

Patients aged > 18 years, who during the previous six months suffered AMI or unstable angina pectoris were recruited. 55 patients were screened, 13 didn't meet the inclusion criterias, and 42 patients were included.

### Pre-assignment

Screening details:

Inclusion criteria: patients aged >18 years, who during the previous six months suffered AMI or unstable angina pectoris were recruited if they, had newly detected IGT or T2DM confirmed by two screening oral glucose tolerance tests (OGTT).
Exclusion criteria: known diabetes, contraindications to CMR imaging, eGFR < 30 ml/min/1.73 m2; and more.

### Period 1

| Period 1 title | Overall trial (overall period) |
|---|---|
| Is this the baseline period? | Yes |
| Allocation method | Randomised - controlled |
| Blinding used | Double blind |
| Roles blinded | Subject, Investigator |

### Arms

| Are arms mutually exclusive? | Yes |
|---|---|
| **Arm title** | Placebo |

Arm description:

Patients in placebo arm were randomized to 25 mg of corresponding placebo. They received a patient diary, equipment for and instruction on self-monitoring of glucose levels and were seen at the outpatient clinic one and three months later. Seven months after randomization all investigations performed during the baseline visit were repeated. Thereafter the study drug was discharged. Ten months after randomization the patient returned for a final visit, during which all investigations were repeated once more.

| 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:

Patients in placebo arm were randomized to 25 mg of placebo daily. After 7 months the study drug was discharged.

| **Arm title** | Empagliflozin |
|---|---|

Arm description:

Patients in Empagliflozin arm were randomized to 25 mg Empagliflozin daily. They received a patient diary, equipment for and instruction on self-monitoring of glucose levels and were seen at the outpatient clinic one and three months later. Seven months after randomization all investigations performed during the baseline visit were repeated. Thereafter the study drug was discharged. Ten months after randomization the patient returned for a final visit, during which all investigations were repeated once more.

| Arm type | Experimental |
|---|---|
| Investigational medicinal product name | Empagliflozin |
| Investigational medicinal product code | |
| Other name | |
| Pharmaceutical forms | Film-coated tablet |
| Routes of administration | Oral use |

Dosage and administration details:

Patients in Empagliflozin arm were randomized to 25 mg of Empagliflozin daily. After 7 months the study drug was discharged.

| Number of subjects in period 1 | Placebo | Empagliflozin |
|---|---|---|
| Started | 22 | 20 |
| Completed | 22 | 20 |

## Baseline characteristics

### Reporting groups

| Reporting group title | Placebo |
|---|---|

Reporting group description:

Patients in placebo arm were randomized to 25 mg of corresponding placebo. They received a patient diary, equipment for and instruction on self-monitoring of glucose levels and were seen at the outpatient clinic one and three months later. Seven months after randomization all investigations performed during the baseline visit were repeated. Thereafter the study drug was discharged. Ten months after randomization the patient returned for a final visit, during which all investigations were repeated once more.

| Reporting group title | Empagliflozin |
|---|---|

Reporting group description:

Patients in Empagliflozin arm were randomized to 25 mg Empagliflozin daily. They received a patient diary, equipment for and instruction on self-monitoring of glucose levels and were seen at the outpatient clinic one and three months later. Seven months after randomization all investigations performed during the baseline visit were repeated. Thereafter the study drug was discharged. Ten months after randomization the patient returned for a final visit, during which all investigations were repeated once more.

| Reporting group values | Placebo | Empagliflozin | Total |
|---|---|---|---|
| Number of subjects | 22 | 20 | 42 |
| 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 | 68 | 67 | |
| standard deviation | ± 8 | ± 8 | - |
| Gender categorical | | | |
| Units: Subjects | | | |
| Female | 4 | 4 | 8 |
| Male | 18 | 16 | 34 |
| Smoking | | | |
| Units: Subjects | | | |
| Yes | 19 | 19 | 38 |
| No | 3 | 1 | 4 |
| Index event | | | |
| Units: Subjects | | | |
| Myocardial infarction | 19 | 17 | 36 |
| Unstable angina | 3 | 3 | 6 |
| Peripheral artery disease | | | |

| Medical history | | | |
|---|---|---|---|
| Units: Subjects | | | |
| Yes | 0 | 1 | 1 |
| No | 22 | 19 | 41 |

| Stroke/TIA | | | |
|---|---|---|---|
| Medical history. TIA = transitory ischaemic attack | | | |
| Units: Subjects | | | |
| Yes | 0 | 2 | 2 |
| No | 22 | 18 | 40 |

| Heart failure | | | |
|---|---|---|---|
| Medical history | | | |
| Units: Subjects | | | |
| Yes | 0 | 1 | 1 |
| No | 22 | 19 | 41 |

| ACE-inhibitors/ARBs | | | |
|---|---|---|---|
| Pharmacological treatment. ACE = angiotensin converting enzyme; ARB = angiotensin receptor blocker | | | |
| Units: Subjects | | | |
| Yes | 18 | 17 | 35 |
| No | 4 | 3 | 7 |

| Beta-blockers | | | |
|---|---|---|---|
| Pharmacological treatment | | | |
| Units: Subjects | | | |
| Yes | 21 | 17 | 38 |
| No | 1 | 3 | 4 |

| Calcium channel blockers | | | |
|---|---|---|---|
| Pharmacological treatment | | | |
| Units: Subjects | | | |
| Yes | 4 | 5 | 9 |
| No | 18 | 15 | 33 |

| Diuretics | | | |
|---|---|---|---|
| Pharmacological treatment | | | |
| Units: Subjects | | | |
| Yes | 3 | 7 | 10 |
| No | 19 | 13 | 32 |

| Statins | | | |
|---|---|---|---|
| Pharmacological treatment | | | |
| Units: Subjects | | | |
| Yes | 21 | 20 | 41 |
| No | 1 | 0 | 1 |

| Antiaggregants | | | |
|---|---|---|---|
| Pharmacological treatment | | | |
| Units: Subjects | | | |
| Yes | 16 | 19 | 35 |
| No | 6 | 1 | 7 |

| Anticoagulants | | | |
|---|---|---|---|
| Pharmacological treatment | | | |
| Units: Subjects | | | |
| Yes | 2 | 0 | 2 |
| No | 20 | 20 | 40 |

| Body mass index | | | |
|---|---|---|---|
| Units: (kg/m2) | | | |
| arithmetic mean | 27 | 27 | |
| standard deviation | ± 4 | ± 4 | - |
| Systolic blood pressure | | | |
| Units: mmHg | | | |
| arithmetic mean | 131 | 130 | |
| standard deviation | ± 16 | ± 16 | - |
| Diastolic blood pressure | | | |
| Units: mmHg | | | |
| arithmetic mean | 80 | 79 | |
| standard deviation | ± 10 | ± 10 | - |
| Heart rate | | | |
| Units: beats/minute | | | |
| arithmetic mean | 68 | 62 | |
| standard deviation | ± 8 | ± 7 | - |
| Haemoglobin | | | |
| Laboratory findings | | | |
| Units: g/L | | | |
| arithmetic mean | 140 | 142 | |
| standard deviation | ± 10 | ± 19 | - |
| LDL-cholesterol | | | |
| Laboratory findings. LDL = low-density lipoprotein | | | |
| Units: mmol/L | | | |
| arithmetic mean | 1.4 | 1.4 | |
| standard deviation | ± 0.6 | ± 0.3 | - |
| Triglycerides | | | |
| Laboratory findings | | | |
| Units: mmol/L | | | |
| arithmetic mean | 3.3 | 1.3 | |
| standard deviation | ± 9.3 | ± 0.6 | - |
| Creatinine | | | |
| Laboratory findings | | | |
| Units: μmol/L | | | |
| arithmetic mean | 81 | 86 | |
| standard deviation | ± 18 | ± 16 | - |
| eGFR | | | |
| Laboratory findings. eGFR = estimated glomerular filtration | | | |
| Units: ml/min/1.73 m2 | | | |
| arithmetic mean | 73 | 68 | |
| standard deviation | ± 14 | ± 13 | - |
| Troponin | | | |
| Laboratory findings | | | |
| Units: ng/L | | | |
| arithmetic mean | 16 | 15 | |
| standard deviation | ± 12 | ± 14 | - |
| hsCRP | | | |
| Laboratory findings. hsCRP = high-sensitivity C-reactive protein | | | |
| Units: mg/L | | | |
| arithmetic mean | 1.7 | 1.2 | |
| standard deviation | ± 2.4 | ± 0.8 | - |
| NT-pro-BNP | | | |

| Laboratory findings. BNP = brain natriuretic peptide | | | |
|---|---|---|---|
| Units: ng/L | | | |
|     arithmetic mean | 249 | 361 | |
|     standard deviation | ± 305 | ± 406 | - |
| Fasting plasma glucose | | | |
| Laboratory findings | | | |
| Units: mmol/L | | | |
|     arithmetic mean | 6.5 | 6.5 | |
|     standard deviation | ± 1.1 | ± 0.9 | - |
| 2-hour post load glucose | | | |
| Laboratory findings | | | |
| Units: mmol/L | | | |
|     arithmetic mean | 10.6 | 10.9 | |
|     standard deviation | ± 2.9 | ± 2.9 | - |
| HbA1c | | | |
| Laboratory findings. HbA1c = glycated haemoglobin A1c | | | |
| Units: mmol/mol | | | |
|     arithmetic mean | 43 | 42 | |
|     standard deviation | ± 9 | ± 6 | - |
| LV end-diastolic volume | | | |
| Units: ml | | | |
|     median | 141 | 146 | |
|     standard deviation | ± 39 | ± 33 | - |

## End points

### End points reporting groups

| Reporting group title | Placebo |
|---|---|

Reporting group description:

Patients in placebo arm were randomized to 25 mg of corresponding placebo. They received a patient diary, equipment for and instruction on self-monitoring of glucose levels and were seen at the outpatient clinic one and three months later. Seven months after randomization all investigations performed during the baseline visit were repeated. Thereafter the study drug was discharged. Ten months after randomization the patient returned for a final visit, during which all investigations were repeated once more.

| Reporting group title | Empagliflozin |
|---|---|

Reporting group description:

Patients in Empagliflozin arm were randomized to 25 mg Empagliflozin daily. They received a patient diary, equipment for and instruction on self-monitoring of glucose levels and were seen at the outpatient clinic one and three months later. Seven months after randomization all investigations performed during the baseline visit were repeated. Thereafter the study drug was discharged. Ten months after randomization the patient returned for a final visit, during which all investigations were repeated once more.

### Primary: LV end-diastolic volume

| End point title | LV end-diastolic volume |
|---|---|

End point description:

The LV end-diastolic volume from at seven months measured by CMR.

| End point type | Primary |
|---|---|

End point timeframe:

At seven months.

| End point values | Placebo | Empagliflozin | | |
|---|---|---|---|---|
| Subject group type | Reporting group | Reporting group | | |
| Number of subjects analysed | 22 | 20 | | |
| Units: ml | | | | |
| arithmetic mean (standard deviation) | 143 (± 39) | 145 (± 41) | | |

### Statistical analyses

| Statistical analysis title | Change in the LV end-diastolic volume |
|---|---|

Statistical analysis description:

Change in the LV end-diastolic volume from baseline to seven months measured by CMR

| Comparison groups | Placebo v Empagliflozin |
|---|---|

| Number of subjects included in analysis | 42 |
|---|---|
| Analysis specification | Pre-specified |
| Analysis type | superiority |
| P-value | > 0.05 |
| Method | ANOVA |

| | |
|---|---|
| Number of subjects included in analysis | 42 |
| Analysis specification | Pre-specified |
| Analysis type | superiority |
| P-value | > 0.05 |
| Method | ANOVA |

## Adverse events

### Adverse events information

Timeframe for reporting adverse events:

At each study visit i.e. after 7 months on randomized treatment and 3 months after study drug cessation.

| Assessment type | Systematic |
|---|---|

### Dictionary used

| Dictionary name | n/a |
|---|---|
| Dictionary version | n/a |

### Reporting groups

| Reporting group title | Overall group |
|---|---|

Reporting group description: -

| Serious adverse events | Overall group | | |
|---|---|---|---|
| Total subjects affected by serious adverse events | | | |
| subjects affected / exposed | 0 / 42 (0.00%) | | |
| number of deaths (all causes) | 0 | | |
| number of deaths resulting from adverse events | 0 | | |

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

| Non-serious adverse events | Overall group | | |
|---|---|---|---|
| Total subjects affected by non-serious adverse events | | | |
| subjects affected / exposed | 9 / 42 (21.43%) | | |
| Neoplasms benign, malignant and unspecified (incl cysts and polyps) | | | |
| Prostate cancer | | | |
| subjects affected / exposed | 1 / 42 (2.38%) | | |
| occurrences (all) | 1 | | |
| Cardiac disorders | | | |
| Atrial fibrillation | | | |
| subjects affected / exposed | 1 / 42 (2.38%) | | |
| occurrences (all) | 1 | | |
| Syncope | | | |
| subjects affected / exposed | 1 / 42 (2.38%) | | |
| occurrences (all) | 1 | | |
| Eye disorders | | | |

| | | | |
|---|---|---|---|
| Amaurosis fugax | | | |
| subjects affected / exposed | 1 / 42 (2.38%) | | |
| occurrences (all) | 1 | | |
| **Respiratory, thoracic and mediastinal disorders** | | | |
| Chest pain | | | |
| subjects affected / exposed | 2 / 42 (4.76%) | | |
| occurrences (all) | 2 | | |
| **Infections and infestations** | | | |
| Urinary tract infection | | | |
| subjects affected / exposed | 2 / 42 (4.76%) | | |
| occurrences (all) | 2 | | |
| Fungal infection vaginal | | | |
| subjects affected / exposed | 1 / 42 (2.38%) | | |
| 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

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

A weakness may be the limited number of patients, but it is unlikely that the inclusion of further study participants of the same kind would have changed the results.

Notes:

### Online references

http://www.ncbi.nlm.nih.gov/pubmed/36336088