Impact of use of newer glucose lowering drugs on outcomes in patients with COVID-19

First published: 30/06/2020

Last updated: 21/03/2021

Study Finalised

Administrative details

EU PAS number

EUPAS36089

Study ID

40215

DARWIN EU® study

No

Study countries

☐ Denmark

Study description

The coronavirus disease 2019 (COVID-19) pandemic poses great health care challenges worldwide. In Denmark, authority regulated social distancing has been the key to limit rapid spread of Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) keeping the diseased population below the tolerable threshold. However, the COVID-19 epidemic is expected to return in one or more waves which emphasizes the need for identifying modifiable risk factors in vulnerable patients. Newer glucose lowering drugs (GLD) have potential for affecting the disease course by suppressing the inflammatory state or by upregulation of the angiotensin-converting enzyme 2 (ACE2). The study is a national cohort study on patients tested positive for SARS-CoV-2 in Denmark. This study will examine the association between ongoing use of newer glucose-lowering drugs (Glucagon Like Peptid-1 (GLP-1) receptor agonists, Dipeptidyl Peptidase-4 (DPP4) inihibitors and Sodium-Glucose Transport Protein-2 (SGLT2) inhibitors) and other glucose lowering drugs and risk of severe outcomes in COVID-19 patients. Severe outcomes include hospital admission, intensive care unit (ICU) admission, mechanical ventilation and death within 30 days from positive SARS-CoV-2 test.

Study status

Finalised

Research institutions and networks

Institutions

Pharmacoepi center, University of Southern Denmark

Denmark

First published: 22/04/2010

Last updated: 27/07/2023

Institution | Educational Institution | ENCePP partner

Department of Clinical Epidemiology Aarhus University Hospital, Aarhus, Denmark, Center for Research and Disruption in Infectious Diseases, Department of Infectious Diseases Amager Hvidovre Hospital, Hvidovre, Denmark

Contact details

Study institution contact

Simone Bastrup Israelsen

simone.elisabeth.bastrup.israelsen.02@regionh.dk

Study contact

simone.elisabeth.bastrup.israelsen.02@regionh.dk

Primary lead investigator

Simone Bastrup Israelsen

Primary lead investigator

Study timelines

Date when funding contract was signed
Actual: 22/04/2020

Study start date
Actual: 27/02/2020

Data analysis start date
Planned: 01/07/2020

Date of final study report
Planned: 01/10/2020

Actual: 13/01/2021

Sources of funding

- No external funding

Study protocol

Impact of use of newer glucose lowering drugs_v1.4_29.06.2020.pdf (374.66 KB)

Regulatory

Was the study required by a regulatory body?

No

Is the study required by a Risk Management Plan (RMP)?

Not applicable

Methodological aspects

Study type

Study topic:

Human medicinal product

Disease /health condition

Study type:

Non-interventional study

Scope of the study:

Assessment of risk minimisation measure implementation or effectiveness

Data collection methods:

Secondary use of data

Main study objective:

The main objective of the study is to examine the association between ongoing use of newer glucose-lowering drugs (DPP4i, SGLT2i, and GLP-1 receptor agonists) and other glucose lowering drugs and risk of severe outcomes in COVID-19 patients.

Study Design

Non-interventional study design

Cohort

Study drug and medical condition

Anatomical Therapeutic Chemical (ATC) code

(A10BJ) Glucagon-like peptide-1 (GLP-1) analogues

Glucagon-like peptide-1 (GLP-1) analogues

(A10BK) Sodium-glucose co-transporter 2 (SGLT2) inhibitors

Sodium-glucose co-transporter 2 (SGLT2) inhibitors

(A10BH) Dipeptidyl peptidase 4 (DPP-4) inhibitors

Dipeptidyl peptidase 4 (DPP-4) inhibitors

Medical condition to be studied

COVID-19

Suspected COVID-19

Population studied

Short description of the study population

The study population consists of all patients tested positive for SARS-CoV-2 in Denmark who have had permanent residence in Denmark for at least the past year.

Age groups

- Term newborn infants (0 – 27 days)
- Infants and toddlers (28 days – 23 months)
- Children (2 to < 12 years)
- Adolescents (12 to < 18 years)
- Adults (18 to < 46 years)
- Adults (46 to < 65 years)
- Adults (65 to < 75 years)
- Adults (75 to < 85 years)
- Adults (85 years and over)

Special population of interest

Other

Special population of interest, other

COVID-19 patients

Estimated number of subjects

10000

Study design details

Outcomes

The primary outcome is death within 30 days after positive SARS-CoV-2 test. The secondary outcomes include hospital admission, intensive care unit (ICU) admission and mechanical ventilation within 30 days after positive SARS-CoV-2 test.

Data analysis plan

We will estimate risk ratios for hospital admission, ICU admission, mechanical ventilation and death in patients tested positive for SARS-CoV-2 for the exposed group (current use of GLP-1 receptor agonists) vs. the active comparator group (current use of SGLT2 inhibitors) by log binomial regression. We will apply propensity score matching and inverse probability of treatment weighting to adjust for pre-existing differences in significant risk factors between the exposed and active comparator group. Patients will be matched 1:1, unless other matching sets are possible. Covariates include diabetes duration, use of other glucose lowering drugs, diabetic complications, cardiovascular disease, total burden of comorbidities, markers of tobacco smoking, alcoholism, medical obesty and socioeconomic markers. In secondary analyses, we will study patients with current use of DPP-4 inhibitors compared to the active comparator group (i.e. patients with current use of SGLT2 inhibitors).

Documents

Study results

Israelsen et al. 2021 DOM - Comparable COVID-19 outcomes with current use of GLP-1 RA, DPP-4i or SGLT2i among patients with diabetes who tested positive for SARS-CoV-2.pdf (399.47 KB)

Data management

ENCePP Seal

The use of the ENCePP Seal has been discontinued since February 2025. The ENCePP Seal fields are retained in the display mode for transparency but are no longer maintained.

Data sources

Data source(s)

Danish registries (access/analysis)

Data source(s), other

Danish Registries (access/analysis)

Data sources (types)

Administrative healthcare records (e.g., claims)

Disease registry

Drug dispensing/prescription data

Use of a Common Data Model (CDM)

CDM mapping

No

Data quality specifications

Check conformance

Unknown

Check completeness

Unknown

Check stability

Unknown

Check logical consistency

Unknown

Data characterisation

Data characterisation conducted

No