Clinical Trial Protocol
Iranian Registry of Clinical Trials

10 Jun 2026

Evaluating the effectiveness of caffeine on blood gases and short-term hospital outcomes in patients with acute COPD exacerbation requiring NIV in patients referred to Bahonar Emergency Department.

Protocol summary

Study aim

To evaluate the effect of caffeine on arterial blood gas parameters and short-term clinical outcomes in patients with acute exacerbation of COPD requiring non-invasive ventilation (NIV).

Design

Randomized, double-blind, placebo-controlled, parallel-group trial. Block randomization (blocks of 4 and 6) with computer-generated sequence. 140 patients (70 per group).

Settings and conduct

Setting: Emergency department and internal medicine ward, Bahonar Hospital, Karaj, Iran. Patients with acute COPD exacerbation requiring NIV will be randomly assigned to intervention or control. Double-blind design (patients and outcome assessor blinded). ABG parameters (pH, PCO2, PO2) and O2 saturation measured at baseline and daily for 5 days. Clinical outcomes (intubation, hospital/ICU stay, mortality) recorded.

Participants/Inclusion and exclusion criteria

Inclusion criteria: Age 40-85 years, acute exacerbation of COPD, NIV indication (respiratory acidosis: pH≤7.35, PaCO2≥45 mmHg or severe dyspnea with respiratory muscle fatigue). Exclusion criteria: Immediate intubation need, hemodynamic instability, decreased consciousness, facial abnormalities preventing mask fit, recent thoracic/abdominal surgery, cardiac arrhythmias, caffeine hypersensitivity, pregnancy, breastfeeding, concurrent trial participation.

Intervention groups

Intervention group: Standard COPD exacerbation treatment + NIV + oral caffeine 200 mg twice daily for 5 days. Control group: Standard COPD exacerbation treatment + NIV + placebo twice daily for 5 days.

Main outcome variables

Primary outcomes: 1. Change in arterial blood gas parameters (pH, PaCO2 [mmHg], PaO2 [mmHg]) from baseline to day 5, measured daily. 2. Change in O2 saturation (%) from baseline to day 5, measured daily by pulse oximetry. Time points: Baseline and daily at 8:00 AM for 5 days

General information

Reason for update

Acronym

IRCT registration information

IRCT registration number: **IRCT20250430065541N1**
Registration date: **2026-02-27, 1404/12/08**
Registration timing: **prospective**

Last update: **2026-02-27, 1404/12/08**
Update count: **0**

Registration date

2026-02-27, 1404/12/08

Registrant information

Name

Nasim Barjaste

Name of organization / entity

Alborz University of Medical Sciences

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Recruitment status

recruiting

Funding source

Expected recruitment start date

2026-04-04, 1405/01/15

Expected recruitment end date

2026-07-06, 1405/04/15

Actual recruitment start date

empty

Actual recruitment end date

empty

Trial completion date

empty

Scientific title

Evaluating the effectiveness of caffeine on blood gases and short-term hospital outcomes in patients with acute COPD exacerbation requiring NIV in patients referred to Bahonar Emergency Department.

Public title

Effect of caffeine in COPD

Purpose

Treatment

Inclusion/Exclusion criteria

Inclusion criteria:

COPD patients who meet the criteria for COPD exacerbation (presence of any of the symptoms of worsening shortness of breath, increased sputum volume, increased sputum viscosity) COPD exacerbation patient who requires NIV during an attack Absence of contraindications to NIV placement (trauma or facial deformity, severe decreased level of consciousness, abundant pulmonary secretions, high risk of aspiration, cardiorespiratory arrest) Patient consents to participate in the study4 Age 40 to 85 years

Exclusion criteria:

1. Patient over 85 years of age Pregnancy History of caffeine sensitivity Patient unwillingness to participate in the study Decreased level of consciousness Facial or chest deformity Asthma Neuromuscular diseases and chest disorders Pneumothorax Persistent and frequent vomiting Intolerance to NIV for any reason Occurrence of caffeine side effects

Age

From **40 years** old to **85 years** old

Gender

Both

Phase

3

Groups that have been masked

- Participant
- Care provider
- Investigator
- Outcome assessor

Sample size

Target sample size: **70**

Randomization (investigator's opinion)

Randomized

Randomization description

Patients eligible for the study will be determined and 70 of them will be selected as available. Based on a random number table, they will be randomly divided into two intervention and control groups (each group includes 35 people) using a random block permutation method with blocks of size 4 (Random allocation).

Blinding (investigator's opinion)

Double blinded

Blinding description

This study is designed as a double-blind study. - The caffeine and placebo capsules will be identical in shape, size, color, and packaging. - One person will be responsible for preparing, coding, and randomly distributing the containers based on the randomization list. - Participants, treating physicians, nurses, and researchers assessing clinical outcomes will be unaware of the contents of the capsules.

Placebo

Used

Assignment

Parallel

Other design features

Randomized, double-blind, placebo-controlled, parallel-group clinical trial. Randomization will be performed using block randomization method with block sizes of 4 and 6, using a computer-generated random number sequence. The study includes 140 patients (70 in each group) with acute exacerbation of COPD requiring non-invasive ventilation (NIV).

Secondary Ids

empty

Ethics committees

1

Ethics committee

Name of ethics committee

Ethics committee of Alborz University of Medical Sciences

Street address

Alborz University of Medical Sciences(ABZUMS), Taleghani Boulevard, Taleghani square

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Karaj

Province

Alborz

Postal code

3149779453

Approval date

2026-02-15, 1404/11/26

Ethics committee reference number

IR.ABZUMS.REC.1404.352

Health conditions studied

1

Description of health condition studied

Chronic obstructive pulmonary disease

ICD-10 code

J44.1

ICD-10 code description

Chronic obstructive pulmonary disease with (acute) exacerbation

Primary outcomes

1

Description
Change in arterial partial pressure of carbon dioxide (PaCO2) from baseline to day 5
Timepoint
Baseline (before intervention) and daily at 8:00 AM for 5 consecutive days
Method of measurement
Measured using a calibrated arterial blood gas analyzer from arterial blood samples

Secondary outcomes

empty

Intervention groups

1

Description
Intervention group: Caffeine tablets 200 mg orally every 12 hours for 5 days
Category
Treatment - Drugs

Recruitment centers

1

Recruitment center
Name of recruitment center
Bahonar Hospital
Full name of responsible person
Nasim Barjaste
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Sponsors / Funding sources

1

Sponsor
Name of organization / entity
Alborz University of Medical Sciences
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Grant name
Grant code / Reference number
Is the source of funding the same sponsor organization/entity?
Yes
Title of funding source
Alborz University of Medical Sciences
Proportion provided by this source
100
Public or private sector
Public
Domestic or foreign origin
Domestic
Category of foreign source of funding
empty
Country of origin
Type of organization providing the funding
Academic

Person responsible for general inquiries

Contact
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Latest degree
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Sharing plan

Deidentified Individual Participant Data Set (IPD)
Yes - There is a plan to make this available

Study Protocol
Yes - There is a plan to make this available

Statistical Analysis Plan
Yes - There is a plan to make this available

Informed Consent Form
Yes - There is a plan to make this available

Clinical Study Report
Yes - There is a plan to make this available

Analytic Code
Yes - There is a plan to make this available

Data Dictionary
Yes - There is a plan to make this available

Title and more details about the data/document
De-identified individual participant data (IPD) including demographic characteristics, arterial blood gas parameters (PH, PCO2, PO2), O2 saturation, Borg scale scores, intubation rates, length of hospital stay, ICU admission, and NIV duration.

When the data will become available and for how long
Immediately after publication of the main study results (expected by 2027). No end date.

To whom data/document is available
Researchers and clinicians affiliated with academic and scientific institutions who provide a methodologically sound proposal and sign a data access agreement.

Under which criteria data/document could be used
For individual participant data meta-analysis, secondary analyses related to COPD exacerbation, respiratory physiology, or effects of caffeine on respiratory outcomes. Data should only be used for non-commercial scientific research purposes with proper citation of the original study.

From where data/document is obtainable
Corresponding author: Dr. Somayeh Rezaian, Assistant Professor, Department of Internal Medicine, School of Medicine, Alborz University of Medical Sciences, Karaj, Iran. Email: somaye.rezaian@gmail.com Alternative contact: Nasim Barjasteh (Principal researcher), Email: nasimbarjasteh@gmail.com, Tel: +98 914 560 0782

What processes are involved for a request to access data/document
Interested researchers should submit a formal request via email to the corresponding author, including a brief research proposal and intended use of data. The proposal will be reviewed by the study team within 2-4 weeks. If approved, a data sharing agreement must be signed before data transfer. De-identified data will be provided electronically within 4-6 weeks after agreement finalization.

Comments
Data will be shared in compliance with Alborz University of Medical Sciences ethics guidelines and Iranian national regulations for research data sharing. The study was approved by the ethics committee with reference ID: IR.ABZUMS.REC.1404.352 and registered in IRCT with tracking code: 890.