Clinical Trial Protocol
Iranian Registry of Clinical Trials

18 Sep 2026

Efficacy of empagliflozin in prevention of Doxorubicin-induced cardiotoxicity in patients with breast cancer and receiving AC regimen (Cyclophosphamide + Doxorubicin): a randomized, placebo-controlled, double-blind trial

Protocol summary

Study aim

Evaluation of the effectiveness of Empagliflozin in preventing doxorubicin-induced cardiac toxicity in patients with breast cancer receiving AC regimen

Design

The clinical trial has a control group with parallel groups that is performed in two blind, randomized, phase 3 and on 64 patients. Block randomization method is used for randomization

Settings and conduct

This study was performed at the Imam Khomeini Hospital Cancer Institute, Tehran University of Medical Sciences, with the aim of investigating the possibility of prescribing Empagliflozin to prevent the occurrence of doxorubicin-induced cardiac toxicity in breast cancer patients and on 64 patients who are in two groups. Patients in the two groups are compared in terms of criteria including: blood levels of cardiac biomarkers and echocardiographic results.

Participants/Inclusion and exclusion criteria

Inclusion criteria: People who have recently been definitively diagnosed with breast cancer and are candidates for a chemotherapy regimen containing doxorubicin.

Intervention groups

Patients are divided into two groups. In the first group, Empagliflozin is prescribed with a chemotherapy regimen and in the second group, the same chemotherapy regimen is prescribed with a Placebo

Main outcome variables

Echocardiographic variables including: EF and GLS
Cardiac biomarkers including Troponin I and NT-proBNP

General information

Reason for update

The changes are as follows: 1- In the secondary outcome section, in consultation with the supervisor professors, the CPK-MB test was replaced with the NT-proBNP test, which is much more accurate for heart failure. 2- In the intervention groups section, Actoverco Company was changed to Dr. Abidi Pharmaceuticals. Thank you for your attention.

Acronym

IRCT registration information

IRCT registration number: **IRCT20231014059713N1**
Registration date: **2023-11-18, 1402/08/27**
Registration timing: **prospective**

Last update: **2025-05-04, 1404/02/14**
Update count: **1**

Registration date

2023-11-18, 1402/08/27

Registrant information

Name

Ehsan Shabani

Name of organization / entity

Country

Iran (Islamic Republic of)

Phone

+98 21 4424 3529

Email address

eshabani@razi.tums.ac.ir

Recruitment status

Recruitment complete

Funding source

Expected recruitment start date

2023-11-22, 1402/09/01

Expected recruitment end date

2024-09-21, 1403/06/31

Actual recruitment start date

empty

Actual recruitment end date

empty

Trial completion date

empty

Scientific title

Efficacy of empagliflozin in prevention of Doxorubicin-induced cardiotoxicity in patients with breast cancer and receiving AC regimen (Cyclophosphamide + Doxorubicin): a randomized, placebo-controlled, double-blind trial

Public title

Efficacy of empagliflozin in prevention of Doxorubicin-induced cardiotoxicity in patients with breast cancer

Purpose

Prevention

Inclusion/Exclusion criteria

Inclusion criteria:

A known case of breast cancer and candidate for receiving AC regimen Signing a written informed consent to participate in the study Patient age ≥ 18 Ability to take oral medicine ECOG performance status less than or equal to 2

Exclusion criteria:

A history of breast cancer or a history of receiving chemotherapy regimen containing anthracycline or other chemotherapy drugs causing cardiomyopathy before entering the study Inability to assess left ventricular (LV) function Previous history of chest radiation therapy Evidence of heart failure or left ventricular dysfunction based on echocardiography Diagnosis or history of cardiomyopathies Significant coronary artery disease (history of coronary stenting or stenosis based on previous angiography, history of known IHD or MI) Severe valvular heart disease Cardiac arrhythmia such as atrial fibrillation Symptomatic hypotension or blood pressure less than 90 mmHg at the first visit Liver enzymes more than 3 times ULN before entering the study Significant renal failure (GFR less than 20 ml/min/1.73m2 with CKD-EPI formula) or need for dialysis Simultaneous use of other drugs that can affect parameters of the study (such as ACEi, ARB, beta blockers) Diabetes Pregnancy Breastfeeding Hypersensitivity to SGLT2 inhibitor drugs History of treatment with SGLT2 inhibitors during the last 3 months before the start of the study Participation in other clinical studies simultaneously

Age

From **18 years** old

Gender

Female

Phase

3

Groups that have been masked

- Participant
- Investigator
- Outcome assessor

Sample size

Target sample size: **64**

Randomization (investigator's opinion)

Randomized

Randomization description

Patients are randomly assigned to two groups of intervention (receiving chemotherapy regimen + empagliflozin) and control (receiving chemotherapy regimen + placebo) by using block randomization. This is a double-blinded trial {the patient, researcher (student) and the doctors} and the randomization will be performed by the project executor based on double or quadruple random tables and on each box, a number will be registered, the contents of which will be unknown, and will be given to the researcher and then to the patient.

Blinding (investigator's opinion)

Double blinded

Blinding description

Participants in the study, the physician who introduced them to the research team, the cardiologist who is responsible for measuring echocardiographic parameters of patients in both groups, and the laboratory staff who are responsible for measuring cardiac biomarkers in patients and the student who makes the arrangements (as a researcher) are blinded in this study. The project executor by using block randomization method (using two or four tables), assign a number randomly to each box containing the medicine or placebo, that is given to the researcher and the patient.

Placebo

Used

Assignment

Parallel

Other design features

Secondary Ids

empty

Ethics committees

1

Ethics committee

Name of ethics committee

The Institute of Pharmaceutical Sciences (TIPS) of the Tehran University of Medical Sciences

Street address

The Institute of Pharmaceutical Sciences (TIPS), Tehran University of Medical Sciences, Faculty of Pharmacy, Poursina Avenue

City

Tehran

Province

Tehran

Postal code

14176-13151

Approval date

2023-11-11, 1402/08/20

Ethics committee reference number

IR.TUMS.TIPS.REC.1402.102

Health conditions studied

1

Description of health condition studied
Breast cancer
ICD-10 code
C50
ICD-10 code description
Malignant neoplasm of breast

2

Description of health condition studied
Drug-induced cardiomyopathy
ICD-10 code
I42.7
ICD-10 code description
Cardiomyopathy due to drug and external agent

Primary outcomes

1

Description
LVEF (Left ventricular ejection fraction) : The left ventricular drain fraction or the amount of blood pumped from the left ventricle with each contraction.
Timepoint
Once at the beginning and once a week after the last chemotherapy session
Method of measurement
Using echocardiography performed by a cardiologist

2

Description
GLS (Global longitudinal strain): A sensitive criterion used by echocardiography to measure myocardial deformity and left ventricular contractile strength and can aid in the early diagnosis of cardiotoxicity. A decrease of more than 15% compared to the beginning or an absolute value of -19% after the start of anthracyclines is associated with a significant increase in the risk of future LVEF reduction.
Timepoint
At the beginning and one week after the last chemotherapy session
Method of measurement
Echocardiography by a cardiologist

Secondary outcomes

1

Description
Troponin I: One of the three types of troponin present in the body that is more specific to the myocardium of the heart and as a marker of the heart, can help diagnose myocardial damage. This enzyme increases within a few hours after heart damage and can last for a long time. Remain in my head for 10-14 days.
Timepoint
Once at the beginning and twice at one week after the second and last session of chemotherapy
Method of measurement
Blood sampling and blood level measurement by laboratory

2

Description
NT-proBNP: It is one of the types of natriuretic peptides that indicates the filling pressure inside the heart and the stress of the walls of the ventricles, which is used to diagnose heart failure.
Timepoint
Once at the beginning and twice at one week after the second and last session of chemotherapy.
Method of measurement
Blood sampling and blood level measurement by laboratory

Intervention groups

1

Description
Intervention group: A group in which patients receive Empagliflozin drug produced by abidi pharmaceutical at a dose of 10 mg once in the day along with chemotherapy. The patient will receive this drug from the first day of chemotherapy until one week after the last session. The duration of medication will be 49 or 70 days, depending on the patient's chemotherapy regimen.
Category
Prevention

2

Description
Control group: A group in which patients receive Placebo produced by abidi pharmaceutical once in the day along with chemotherapy. The patient will receive placebo from the first day of chemotherapy until one week after the last session. The duration of medication will be 49 or 70 days, depending on the patient's chemotherapy regimen.
Category
Placebo

Recruitment centers

1

Recruitment center
Name of recruitment center
Imam Khomeini Hospital Cancer Institute
Full name of responsible person
Ehsan Shabani
Street address
Dr. Gharib Street, the end of Keshavarz Boulevard
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ehsaneshabani1374.es@gmail.com

Sponsors / Funding sources

1

Sponsor
Name of organization / entity
Tehran University of Medical Sciences
Full name of responsible person
Dr. Akbar Fotouhi
Street address
Sixth floor, University Central Organization, corner of Quds Street, Keshavarz Boulevard
City
Tehran
Province
Tehran
Postal code
1417653761
Phone
+98 21 8163 3685
Email
vcr@tums.ac.ir
Grant name
Grant code / Reference number
Is the source of funding the same sponsor organization/entity?
Yes
Title of funding source
Tehran 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
Name of organization / entity
Tehran University of Medical Sciences
Full name of responsible person
Ehsan Shabani
Position
Resident
Latest degree
Medical doctor
Other areas of specialty/work
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Person responsible for updating data

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eshabani@razi.tums.ac.ir

Sharing plan

Deidentified Individual Participant Data Set (IPD)
No - There is not a plan to make this available
Justification/reason for indecision/not sharing IPD
It is not necessary
Study Protocol
No - There is not a plan to make this available
Statistical Analysis Plan
No - There is not a plan to make this available
Informed Consent Form
No - There is not a plan to make this available
Clinical Study Report
Yes - There is a plan to make this available
Analytic Code
No - There is not a plan to make this available
Data Dictionary
Not applicable
Title and more details about the data/document
Final proposal report
When the data will become available and for how long
One year
To whom data/document is available
Researchers
Under which criteria data/document could be used
For other researchers to use the results of the data
From where data/document is obtainable
To the main executor of the project Dr. Ehsan Shabani Email: eshabani@razi.tums.ac.ir Mobile: 09014462400 Address: No. 1, Nahid Ave., Marzdaran Blvd., Ashrafi Esfahani Expy
What processes are involved for a request to access data/document
Send email to the main executor of the project Email: eshabani@razi.tums.ac.ir
Comments