Clinical Trial Protocol
Iranian Registry of Clinical Trials

10 Jun 2026

Comparison of the Efficacy of Phenytoin and Levetiracetam in Children with Benzodiazepine-Resistant Status Epilepticus: A Randomized Controlled Clinical Trial

Protocol summary

Study aim

Comparison of the efficacy of Phenytoin and Levetiracetam in children with benzodiazepine-resistant status epilepticus.

Design

Study Type: Randomized Controlled Trial (RCT). Randomization: Block randomization using blocks of 2, 4, and 8. Blinding: Double-blinding is not feasible due to differences in infusion durations.

Settings and conduct

Location: Mofid Hospital, Tehran. Procedure: Patients with persistent status epilepticus after two doses of benzodiazepines are randomized into one of the two treatment groups

Participants/Inclusion and exclusion criteria

Inclusion Criteria: Boys or girls aged 6 months to 17 years and 11 months. Benzodiazepine-resistant status epilepticus (BRSE) after two doses of benzodiazepines. Exclusion Criteria: Known or suspected pregnancy. Allergy or contraindication to Levetiracetam or Phenytoin. Known renal failure (renal function below 50% of the expected for age). Prior administration of a second-line antiepileptic drug before emergency department admission. Seizures following head trauma. Underlying heart disease.

Intervention groups

Group 1: Intravenous Levetiracetam at a dose of 40 mg/kg over 5 minutes (maximum dose 2.5 g). Group 2: Intravenous Phenytoin at a dose of 20 mg/kg over at least 20 minutes (maximum dose 2 g at a maximum infusion rate of 1 mg/kg/min).

Main outcome variables

Primary Outcome: Time from the start of drug infusion to the cessation of all observable seizure activity. Secondary Outcomes: Requirement for additional antiepileptic drugs, ICU admission, and occurrence of serious adverse events (death, respiratory depression, cardiovascular instability).

General information

Reason for update

Acronym

IRCT registration information

IRCT registration number: **IRCT20241019063425N1**
Registration date: **2025-01-02, 1403/10/13**
Registration timing: **registered_while_recruiting**

Last update: **2025-01-02, 1403/10/13**
Update count: **0**

Registration date

2025-01-02, 1403/10/13

Registrant information

Name
Seyed Amin Jazayeri
Name of organization / entity
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Iran (Islamic Republic of)
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aminjaz430@yahoo.com

Recruitment status

Recruitment complete

Funding source

Expected recruitment start date

2024-12-30, 1403/10/10

Expected recruitment end date

2025-12-22, 1404/10/01

Actual recruitment start date

empty

Actual recruitment end date

empty

Trial completion date
empty

Scientific title
Comparison of the Efficacy of Phenytoin and Levetiracetam in Children with Benzodiazepine-Resistant Status Epilepticus: A Randomized Controlled Clinical Trial

Public title
Trial of Phenytoin and Levetiracetam in Children with Resistant Status Epilepticus

Purpose
Treatment

Inclusion/Exclusion criteria

Inclusion criteria:
Boys or girls aged 6 months to 17 years and 11 months The patient has received two consecutive doses of first-line treatment but continues to experience ongoing status epilepticus.

Exclusion criteria:
Patients with known or suspected pregnancy Patients with a known contraindication or allergy to Levetiracetam or Phenytoin Patients with known renal failure (patients undergoing hemodialysis or with renal function below 50% of the expected for their age) Prior administration of a second-line antiepileptic drug before admission to the emergency department Seizures following head trauma Individuals with underlying heart disease

Age
From **6 months** old to **18 years** old

Gender
Both

Phase
3

Groups that have been masked
No information

Sample size
Target sample size: **128**

Randomization (investigator's opinion)
Randomized

Randomization description
Double-blinding is not feasible due to the difference in the infusion durations of these two drugs. A random sequence prepared in advance, using blocks of 2, 4, and 8, is generated through simple randomization and used to assign each patient to a treatment. Patients are entered into the random sequence based on the order of their arrival.

Blinding (investigator's opinion)
Not blinded

Blinding description

Placebo
Not used

Assignment
Parallel

Other design features

Secondary Ids

empty

Ethics committees

1

Ethics committee

Name of ethics committee
The specialized committee of ethics in biomedical research

Street address
Shahid Beheshti University of Medical Sciences and Health Services, University Headquarters, Building No. 2, 6th Floor, Arabi Street, Yemen Street, Shahid Chamran Highway, Tehran, Iran.

City
Tehran

Province
Tehran

Postal code
1985717444

Approval date
2024-10-12, 1403/07/21

Ethics committee reference number
IR.SBMU.MSP.REC.1403.390

Health conditions studied

1

Description of health condition studied
status epilepticus

ICD-10 code
G40.301

ICD-10 code description
refractory status epilepticus

Primary outcomes

1

Description
The time from the start of drug injection to the cessation of all visible signs of seizure activity, which is defined as the cessation of all rhythmic seizure activity.

Timepoint
From the time of drug injection to the end of epileptic status

Method of measurement
using a stopwatch by the therapist

Secondary outcomes

1

Description
The need for tertiary anticonvulsants to manage seizures after second-line therapy

Timepoint
After failure to respond to second-line therapy

Method of measurement
The number of patients who needed third-line treatment is recorded in each group

Intervention groups

1

Description

Intervention group: Levetiracetam is administered over 5 minutes at a dose of 40 mg/kg, with a maximum dose of 2.5 grams. Following the initiation of injection, the patient is monitored by the resident for the cessation of SE symptoms, and when possible, a video recording is made to document the exact time SE ends. During SE treatment, the APLS algorithm is always followed, and emergency measures (e.g., intubation) are performed if necessary.

Category

Treatment - Drugs

2

Description

Intervention group: Phenytoin is administered over a minimum of 20 minutes at a dose of 20 mg/kg, with a maximum dose of 2 grams and an infusion rate of no more than 1 mg/kg/min. If one medication does not result in a response, the patient is reevaluated, and the persistence of SE is confirmed before initiating another medication. For instance, if the patient does not respond to phenytoin, levetiracetam will be started. The response to phenytoin is assessed up to 25 minutes after initiation, while the response to levetiracetam is evaluated up to 10 minutes after the start of infusion. Patients' outcomes are documented accordingly.

Category

Treatment - Drugs

Recruitment centers

1

Recruitment center

Name of recruitment center
Mofid's children hospital

Full name of responsible person
Farzad Ahmad Abadi

Street address
Mofid children hospital, Shariati Street, above Hosseinieh Ershad, Tehran, Tehran Province, Iran.

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Sponsors / Funding sources

1

Sponsor

Name of organization / entity
Shahid Beheshti University of Medical Sciences

Full name of responsible person
Farzad Ahmadabadi

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Shahid Shahriari Square, Shahid Shahriari Square, Shahid Beheshti University, Shahid Beheshti University, Building No. 2, Faculty of Health, Neuroscience Research Center (3rd and 4th floor), Evin, Tehran, Iran

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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
Shahid Beheshti 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
Shahid Beheshti University of Medical Sciences

Full name of responsible person
Farzad Ahmadabadi

Position
Professor of Shahid Beheshti University of Medical Sciences

Latest degree
Subspecialist

Other areas of specialty/work
Neuroscience

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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
There is no further information
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
No - There is not a plan to make this available
Analytic Code
No - There is not a plan to make this available
Data Dictionary
No - There is not a plan to make this available