Clinical Trial Protocol
Iranian Registry of Clinical Trials

27 Jul 2026

Comparison of effects of phenobarbital and levetiracetam in the control of neonatal seizure

Protocol summary

Study aim
Comparison of the effect of phenobarbital and levetiracetam in the control of neonatal seizures

Design
A non-inferiority controlled randomized clinical trial, with parallel groups, double-blinded, phase 2 on 74 patients. Stata software is used for randomization.

Settings and conduct
The design will be a double-blinded non-inferiority controlled clinical trial which will be done under the supervision of Mashhad University of Medical Sciences in NICU of Ghaem Hospital in Mashhad in 2020. Infants under 1 month of age with a gestational age of 34 weeks admitted to the NICU due to seizures of unknown cause are included in the study. Concealment will be done using closed envelops and patients and assessor will be unaware of treatment groups. In the intervention group, injection of levetiracetam and in the control group, phenobarbital will be administered.

Participants/Inclusion and exclusion criteria
Infants under 1 month of age with a gestational age of 34 weeks or more and weighing 2 kg or more Who have been admitted to the pediatric emergency room or NICU due to seizures are included in the study. Neonates with underlying anomalies, systemic metabolic disease, structural disorders of the brain, previous history of anticonvulsant drug use, drug allergies are not included in the study.

Intervention groups
The patients in intervention group are treated with levetiracetam injection (500 mg / 5ml STRAGEN pharmaceutical company) at a loading dose of 30 mg / kg and infusion rate of 2 mg / kg / min (within 10 Cc of normal saline) under cardiorespiratory monitoring. Patients in the control group are treated with ampoules of Phenobarbital (200mg/ml from Chemidarou company) at a loading dose of 20 mg/kg and at a infusion rate of 1 m/kg/min (within 10 Cc of normal saline) under cardiorespiratory monitoring.

Main outcome variables
The control of seizures within 15 minutes of the loading dose infusion

General information

Reason for update

Acronym

IRCT registration information
IRCT registration number: **IRCT20200528047589N1**
Registration date: **2020-09-08, 1399/06/18**
Registration timing: **registered_while_recruiting**

Last update: **2020-09-08, 1399/06/18**
Update count: **0**

Registration date
2020-09-08, 1399/06/18

Registrant information

Name
Farnaz Kalanimoghadam
Name of organization / entity
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Recruitment status
Recruitment complete

Funding source

Expected recruitment start date
2020-08-22, 1399/06/01

Expected recruitment end date
2021-03-19, 1399/12/29

Actual recruitment start date
empty

Actual recruitment end date

empty

Trial completion date

empty

Scientific title

Comparison of effects of phenobarbital and levetiracetam in the control of neonatal seizure

Public title

Comparison of effects of phenobarbital and levetiracetam in neonatal seizure control

Purpose

Prevention

Inclusion/Exclusion criteria

Inclusion criteria:

pregnancy age of 34 weeks or more Weight of greater than or equal to 2 kg Hospitalization due to seizure of unknown cause in the pediatric emergency room or neonatal intensive care unit

Exclusion criteria:

underlying anomaly Systemic metabolic disease Structural disorders of the brain Previous history of anticonvulsant medication Presence of drug allergies including urticaria, flushing, angioedema, anaphylaxis

Age

To **1 month** old

Gender

Both

Phase

3

Groups that have been masked

- Participant
- Outcome assessor

Sample size

Target sample size: **74**

Randomization (investigator's opinion)

Randomized

Randomization description

We use Stata software for random allocation. Blocks of 4, 6 and 8 are used to make the concealment unpredictable. After entering and obtaining informed consent, patients are evaluated for eligibility and then it is determined to which group they are assigned according to the determined sequences.

Blinding (investigator's opinion)

Double blinded

Blinding description

According to randomization, the patient is assigned into one of the control or intervention groups. The drug is prepared at the drug preparation site in the ward, drawn in a syringe and then administered at the patient's bedside. Thus, the form of drug administration will be the same in both groups and based on it, the type of drug can not be determined. Parents of infants and the person who fills out the questionnaires will not know about the prescribed medicine and the form will be filled in according to the assigned code.

Placebo

Not used

Assignment

Parallel

Other design features

Secondary Ids

empty

Ethics committees

1

Ethics committee

Name of ethics committee

Ethics Committee of Mashhad University of Medical Sciences

Street address

Central Organization of Mashhad University of Medical Sciences, Daneshgah street ,Mashhad,Iran

City

Mashhad

Province

Razavi Khorasan

Postal code

91766-99199

Approval date

2020-06-16, 1399/03/27

Ethics committee reference number

IR.MUMS.MEDICAL.REC.1399.171

Health conditions studied

1

Description of health condition studied

Neonatal seizures

ICD-10 code

P90

ICD-10 code description

Convulsions of newborn

Primary outcomes

1

Description

Control of seizures after drug injection

Timepoint

15 minutes after administration of the drug in cases of seizures and within 24 hours in cases where the seizures have stopped.

Method of measurement

Stoping seizure movements clinically

Secondary outcomes

1

Description

the need or lack of need to continue anticonvulsant medication at discharge.

Timepoint

at the time of discharge

Method of measurement
Diagnosis of the treating physician

Intervention groups

1

Description
In the intervention group, patients are treated with levetiracetam injection (500 mg / 5ml STRAGEN pharmaceutical company) at a loading dose of 30 mg / kg and infusion rate of 2 mg / kg / min (within 10 Cc of normal saline) under cardiorespiratory monitoring. If seizures continue with the first dose of levetiracetam, the drug is re-loaded at a dose of 20 mg / kg by the same infusion rate (within 10 cc of normal saline). Then, in case of seizure control, after 24 hours, treatment will be continued with phenobarbital at a dose of 5 mg / kg / day divided every 12 hours and lutiracetam at a dose of 40 mg / kg / day in 2 divided doses every 12 hours, respectively. (Injection rate and method will be similar to loading doses.) In case of non-control of seizures with the first drug, phenytoin ampoule (250 mg / 5ml of Tamin company) as a second-line drug at a loading dose of 20 mg / kg with infusion rate of 1 mg / kg / min (within 10 cc of normal saline) will be used and maintenance treatment with phenytoin at a dose of 5 mg / kg / day will be continued every 12 hours at the same infusion rate. If seizures persist after administration of second-line medication, the Midazolam will be injected at a loading dose of 0.15 mg / kg and then continued with a drop of 1 µg / kg / min. The initial intervention is within 15 minutes of drug administration and the more intervention depends on seizure control. Thus, the total duration of intervention depends on the response of the infant and varies from infant to infant.

Category
Prevention

2

Description
In the control group, patients are treated with ampoules of Phenobarbital (200mg/ml from Chemidarou company) at a loading dose of 20 mg/kg and at the infusion rate of 1 m/kg/min (within 10 Cc of normal saline) under cardiorespiratory monitoring. If seizures continue with the first dose, the drug is re-loaded at a dose of 10 mg/kg by the same infusion rate (within 10 cc of normal saline). Then, in case of seizure control, the infusion will be continued 24 hours later at the same rate at a maintenance dose of 5 mg / kg / day in 2 divided doses every 12 hours. In case of non-control of seizures with the first drug, phenytoin ampoule (250 mg/5ml of Tamin company) as the second-line drug at a loading dose of 20 mg / kg and at the infusion rate of 1 mg / kg / min (within 10 cc of normal saline) will be used and maintenance treatment with infusion of phenytoin at a dose of 5 mg / kg / day will be continued every 12 hours at the same rate. If seizures persist after administration of second-line medication, the Midazolam will be injected at a dose of 0.15 mg / kg and then continued with a drop of 1 µg / kg / min. The initial intervention is within 15 minutes of drug administration and the more intervention depends on seizure control. Thus, the total duration of intervention depends on the response of the infant and varies from infant to infant.

Category
Prevention

Recruitment centers

1

Recruitment center
Name of recruitment center
Ghaem Hospital, Mashhad University of Medical Sciences
Full name of responsible person
Gholam ali Maamouri
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Sponsors / Funding sources

1

Sponsor
Name of organization / entity
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Vice Chancellor for Research, Ghoreshi Building, Mashhad University of Medical Sciences, Daneshgah Street
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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
Mashhad 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
Mashhad University of Medical Sciences

Full name of responsible person
Gholam ali Maamouri

Position
Professor

Latest degree
Subspecialist

Other areas of specialty/work
neonatal specialist

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Person responsible for scientific inquiries

Contact

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Position
Professor

Latest degree
Subspecialist

Other areas of specialty/work
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Person responsible for updating data

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Sharing plan

Deidentified Individual Participant Data Set (IPD)
Undecided - It is not yet known if there will be a plan to make this available

Study Protocol
Undecided - It is not yet known if there will be a plan to make this available

Statistical Analysis Plan
Undecided - It is not yet known if there will be a plan to make this available

Informed Consent Form
Undecided - It is not yet known if there will be a plan to make this available

Clinical Study Report
Undecided - It is not yet known if there will be a plan to make this available

Analytic Code
Undecided - It is not yet known if there will be a plan to make this available

Data Dictionary
Undecided - It is not yet known if there will be a plan to make this available