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Human stem cell therapy for acute respiratory distress syndrome

Submission date	Recruitment status	[ ] Prospectively registered
17/09/2021	Recruiting	[ ] Protocol
Registration date	**Overall study status**	[ ] Statistical analysis plan
26/10/2021	Ongoing	[ ] Results
Last Edited	**Condition category**	[ ] Individual participant data
08/01/2025	Respiratory	[X] Record updated in last year

Plain English summary of protocol

Background and study aims
Acute respiratory distress syndrome (ARDS) is a life-threatening lung injury that allows fluid to leak into the lungs. Breathing becomes difficult and oxygen cannot get into the body. Most people who get ARDS are already at the hospital for trauma or illness.
ARDS, frequently complicated with multiple-organ failure, undoubtedly causes an unacceptably high in-hospital death rate. Although the causes and underlying mechanisms of ARDS have been extensively studied, effective treatment is still limited. Therefore, it is urgent and important to develop a safe and effective treatment for ARDS. Many studies have shown that mesenchymal stem cells (MSCs) effectively improve inflammatory reactions and reduce immune responses. A recent trial showed that human umbilical cord-derived mesenchymal stem cells (HUCDMSCs) are safe with a better clinical outcome in moderate to severe ARDS patients. The aim of this study is to measure the effectiveness of injection of HUCDMSCs in moderate to severe ARDS patients.

Who can participate?
Adult patients aged 20-80 years with moderate to severe ARDS whose symptoms don’t improve 5 days after traditional or standard therapy

What does the study involve?
Participants are randomly allocated into a high-dose treatment group, a low-dose treatment group and a control group. In the low-dose treatment group, participants will be given a high dose of HUCDMSCs two times 72 hours apart. In the high-dose treatment group, participants will be given a low dose of HUCDMSCs two times 72 hours apart. The control group receive only the HUCDMSCs transfer medium two times 72 hours apart.

What are the possible benefits and risks of participating?
The possible benefits include a decrease in death rate, no safety issues, and tolerance of stem cell treatment. The risks include thromboembolic events (blood clots in the veins) during cell delivery, arrhythmia (heart rhythm problems), or any one of exacerbated following complications resulted from pre-existing ARDS, e.g., anemia, hemorrhage, kidney function deterioration, or electrolyte imbalance.

Where is the study run from?
Kaohsiung Chang Gung Memorial Hospital (Taiwan)

When is the study starting and how long is it expected to run for?
March 2020 to December 2027

Who is funding the study?
Chang Gung Memorial Hospital, Chang Gung Medical Foundation (Taiwan)

Who is the main contact?
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Contact information

Type(s)
Public

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Additional identifiers

Clinical Trials Information System (CTIS)
Nil known

ClinicalTrials.gov (NCT)
Nil known

Protocol serial number
2021/03/08 ver1.5, Grant No.: NMRPG8L6151, NMRPG8L6152, NMRPG8L6153

Study information

Scientific Title
Application of human umbilical cord-derived mesenchymal stem cells for moderate to severe acute respiratory distress syndrome: a randomized phase II clinical trial

Study objectives
Human umbilical cord-derived mesenchymal stem cells (HUCDMSCs) may be a therapeutic option for patients with moderate to severe acute respiratory distress syndrome (ARDS)

Ethics approval required
Old ethics approval format

Ethics approval(s)
Approved 14/04/2021, Chang Gung Medical Foundation Institutional Review Board (199, Tunghua North. Road., Songshan Dist., Taiperi, 15057, Taiwan; +886 (0)3 3196200#3708; troublefup6@cgmh.org.tw), ref: 202000098A0

Study design
Prospective single-center interventional randomized controlled trial

Primary study design
Interventional

Study type(s)
Treatment

Health condition(s) or problem(s) studied
Moderate to severe acute respiratory distress syndrome

Interventions
Randomization process
The study sequence will be generated by a computerized random number generator and preserved in a sealed envelope. The envelopes will be opened in consecutive order for enrollment prior to stem cell infusion therapy by research nurses who are blinded to case randomization.

This clinical trial will enroll 60 patients within 3 years and the patients will be categorized into a high-dose treatment group (n=20), a low-dose treatment group (n=20) and a control group (n=20) by a randomized double-blinded, placebo-controlled method. In the low-dose treatment group, patients will be administered the HUCDMSCs twice (6.5 x 10^5/kg/each time, time interval 72h). In the high-dose treatment group, patients will be administered HUCDMSCs twice (6.5 x 10^6/kg/each time, time interval 72 h). The control group will receive only transfer medium twice (1.625 ml/kg/each time, time interval 72 h). The cells or transfer medium will be administered by intravenous injection.

Total duration of treatment: 4 days
Follow-up for all study arms: 1 year

Intervention Type
Biological/Vaccine

Phase
Phase II

Drug/device/biological/vaccine name(s)
Human umbilical cord-derived mesenchymal stem cells (HUCDMSCs)

Primary outcome(s)
The in-hospital mortality and 30-day mortality recorded according to medical charts

Key secondary outcome(s))
1. Severity of ARDS measured using APCHE II (Acute Physiology and Chronic Health Evaluation) score during hospitalization
2. Organ function assessed using Sequential Organ Failure Assessment (SOFA) with parameters of GCS level, PaO_2/FiO_2, vital signs, level of serum creatinine, alanine aminotransferase (ALT), total bilirubin, prothrombin time (PT), activated partial thromboplastin time (aPTT), platelet count, C-reactive protein (CRP), and lactate at baseline (pre-infusion), day 1, 3, 7 post-infusion, and 1-month post-infusion
3. Adverse events of stem cell transplantation including immune response, hyperreactivity, anaphylactic shock, incidental malignancy recorded using pulmonary X-ray or other imaging systems at 12 months post-infusion

Completion date
31/12/2027

Eligibility

Key inclusion criteria
1. Adult subjects aged 20-80 years with moderate to severe ARDS, defined as:
1.1. Acute onset
1.2. Bilateral infiltration on chest X-ray
1.3. Pulmonary wedge pressure ≤18 mmHg
1.4. PaO_2/FiO_2 ≤200 mmHg
1.5. PEEP ≥10 cm H_2O
2. Symptoms don’t improve 5 days after traditional or standard therapy

Participant type(s)
Patient

Healthy volunteers allowed
No

Age group
Adult

Lower age limit
20 years

Upper age limit
80 years

Sex
All

Key exclusion criteria

1. Age <20 or >80 years
2. Pregnancy, breastfeeding
3. Malignancy
4. Autoimmune disease
5. Subjects not suitable for enrollment due to any reason evaluated by the investigator, or patients who have joined other studies

Date of first enrolment
16/04/2020

Date of final enrolment
31/12/2026

Locations

Countries of recruitment
Taiwan

Study participating centre
Kaohsiung Chang Gung Memorial Hospital
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Sponsor information

Organisation
Chang Gung Memorial Hospital

ROR
https://ror.org/02verss31

Funder(s)

Funder type
Hospital/treatment centre

Funder Name
Chiayi Chang Gung Memorial Hospital

Alternative Name(s)
Chia-Yi Chang-Gong Memorial Hospital, Chang Gung Memorial Hospital, Chia-Yi

Funding Body Type
Private sector organisation

Funding Body Subtype
Other non-profit organizations

Location
Taiwan

Results and Publications

Individual participant data (IPD) sharing plan
The data-sharing plans for the current study are unknown and will be made available at a later date.

IPD sharing plan summary
Data sharing statement to be made available at a later date

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Participant information sheet	Participant information sheet	11/11/2025	11/11/2025	No	Yes