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Application of human umbilical cord-derived mesenchymal stem cells for patients with severe acute respiratory distress syndrome and /or profound septic shock complicated with multiple organ failure

Submission date 17/08/2017	**Recruitment status** Recruiting	[ ] Prospectively registered [ ] Protocol
Registration date 23/08/2017	**Overall study status** Ongoing	[ ] Statistical analysis plan [ ] Results
Last Edited 08/01/2024	**Condition category** Signs and Symptoms	[ ] Individual participant data [ ] Record updated in last year

Plain English summary of protocol

Background and study aims
Many acutely ill patients are killed by severe acute respiratory distress syndrome (ARDS) and septic shock complicated with multiple organ failure. ARDS is a condition where the lungs can't provide the body's vital organs with enough oxygen. The causes of ARDS include infection, severe shock, trauma, aspiration injury, or severe systemic inflammation. Septic shock is when blood pressure drops to a dangerously low level after an infection. Many people eventually die of loss of multiple organ function. Even with prompt and proper antibiotic treatment, the death rate is quite high. It is important to find a new method to improve survival rates. Stem cells are able to regulate the immune system, are anti-inflammation and have the ability to repair tissues. The aim of this study to test the safety of human umbilical cord-derived mesenchymal stem cells in patients with ARDS and multiple organ failure complicating severe septic shock.

Who can participate?
Patients aged 20-80 with ARDS or severe septic shock, whose symptoms do not improve 5 days after traditional or standard treatment

What does the study involve?
Participants are randomly allocated to be treated with one of three doses of stem cells administered into their veins. The injected number of stem cells is gradually increased if safety is confirmed after injection of the lower dose. Safety is defined as no relevant side effects, such as allergy, immunosuppressant effect, or treatment-associated organ damage or death. The stem cell treatment takes less than 2 hours. After discharge, participants are followed up regularly in the outpatient setting at 1 month and every 3 months. The total follow-up period is one year.

What are the possible benefits and risks of participating?
The possible benefits of stem cell treatment include life-supporting or life-saving effects. The

treatment may be used in future to protect organ function in critically ill patients. The relevant risks are irregular heart rhythm, heart attack, heart failure, brain ischemia, bleeding, anemia, worsening kidney function, electrolyte imbalance, malignancy, and so on. However, the reported rate of the above side effects is less than 1%.

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?
December 2015 to November 2027

Who is funding the study?
Chang Gung Medical Research Program Grant (Taiwan)

Who is the main contact?
Prof. Hon-Kan Yip
han.gung@msa.hinet.net

Contact information

Type(s)
Public

Contact name
Prof Hon-Kan Yip

Contact details
No. 123, Ta Pei Road Niao Sung District
Kaohsiung
Taiwan
83301
+886 (0)7 731 7123 ext. 8300
han.gung@msa.hinet.net

Additional identifiers

Protocol serial number
N/A

Study information

Scientific Title
Application of human umbilical cord-derived mesenchymal stem cells for patients with severe acute respiratory distress syndrome and/or profound septic shock complicated with multiple organ failure: a phase I clinical trial for evaluation of safety and tolerability

Acronym
HUCDMSC for patients with severe ARDS and/or septic shock

Study objectives

Human umbilical cord-derived mesenchymal stem cells (HUCDMSC) may be a therapeutic option for patients with ARDS and profound septic shock complicated with multiple organ failure.

Ethics approval required
Old ethics approval format

Ethics approval(s)
Chang Gung Memorial Hospital, 16/04/2017, ref: 106-2457C

Study design
Prospective single-center interventional trial

Primary study design
Interventional

Study type(s)
Treatment

Health condition(s) or problem(s) studied
Acute respiratory distress syndrome and/or profound septic shock complicated with multiple organ failure

Interventions
The eligible subjects who are willing to receive intravenous therapy with human umbilical cord-derived mesenchymal stem cells for ARDS and profound septic shock complicated with multiple organ failure will be enrolled into this study. Blood biochemistry study will be performed at baseline. Sequentially numbered opaque, sealed envelopes (SNOSE) will be used to allocate the study subjects. Three different dosages of human umbilical cord-derived mesenchymal stem cells will be administered intravenously:
1. 1.0 x 10(6) cells/kg (n=3)
2. 5.0 x 10(6) cells/kg (n=3)
3. 1.0 x 10(7) cells/kg (n=4)

The injected number of stem cells will be gradually titrated up if safety is confirmed after injection of the prior lower dose. The safety is defined as no relevant side effects after human umbilical cord-derived mesenchymal stem cell therapy, e.g., allergy, immunosuppressant effect, or therapy-associated organ damage or death. The duration of cell-based treatment with intravenous infusion of stem cells is less than 2 hours. After discharge, patients will be followed up regularly in the outpatient setting at 1 month and every 3 months. The total follow-up period is one year.

Intervention Type
Biological/Vaccine

Phase
Phase I

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

Primary outcome(s)

1. Severity of ARDS and septic shock, assessed using APACHE II score at baseline
2. Organ function, assessed daily using SOFA score once daily from enrollment and until freedom from critical condition
3. GCS level, PaO2/FiO2, vital signs, level of serum Cr, ALT, total bilirubin, PT, APTT, platelet count, CRP, and lactate, measured using blood sample once daily from starting treatment
4. In-hospital mortality and 30-day mortality
5. Immune function and cytokine level assessed at baseline, the first 3 days, and one week later

Key secondary outcome(s))
Adverse events including immune response to stem cell therapy, hyperreactivity to HUCDMSC, anaphylactic shock, or incidental malignancy after cell-based therapy. After discharge, patients will be followed up regularly in the outpatient setting at 1 month and every 3 months. The total follow-up period is one year.

Completion date
30/11/2027

Eligibility

Key inclusion criteria
1. Adult subjects aged 20-80 years with severe ARDS or profound septic shock complicated with multiple organ failure due to infection
2. Symptoms do not improve 5 days after traditional or standard therapy
3. Severe acute respiratory distress syndrome defined as acute onset, bilateral infiltration on chest X-ray, pulmonary wedge pressure ≤18 mmHg, and PaO2/FiO2 ≤200 mmHg
4. The definition of profound septic shock complicated with multiple organ failure was systolic blood pressure <90 mmHg with tissue hypoperfusion, combined with at least two organs failure (brain, lung, kidney, liver, or coagulation)

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. Pregnant women

3. Malignancy
4. Autoimmune disease
5. Subjects not suitable for enrollment due to any reason evaluated by investigator
6. Patients who have joined other studies

Date of first enrolment
27/07/2017

Date of final enrolment
01/11/2027

Locations

Countries of recruitment
Taiwan

Study participating centre
Kaohsiung Chang Gung Memorial Hospital
No.123, Ta Pei Road, Niao Sung District
Kaohsiung
Taiwan
83301

Sponsor information

Organisation
Chang Gung Memorial Hospital, Chang Gung Medical Foundation

ROR
https://ror.org/00k194y12

Funder(s)

Funder type
Research organisation

Funder Name
Chang Gung Medical Research Program Grant (grant no.: CMRPG8E1241)

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?
Interim results article	ARDS patients	01/05/2020	21/05/2021	Yes	No
Participant information sheet	Participant information sheet	11/11/2025	11/11/2025	No	Yes