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A prospective study to evaluate the effect of the Molecular Adsorbent Recirculating System (MARS®) for patients with acute liver failure

Submission date
16/12/2013

Recruitment status
No longer recruiting

Registration date
08/01/2014

Overall study status
Completed

Last Edited
16/01/2014

Condition category
Injury, Occupational Diseases, Poisoning

[ ] Prospectively registered
[ ] Protocol
[ ] Statistical analysis plan
[ ] Results
[ ] Individual participant data
[ ] Record updated in last year

Plain English summary of protocol

Background and study aims
The study is for serious liver failure patients in in Korea. Molecular Adsorbent Recirculating System (MARS) is used as a liver-assisting device that helps with recovery of liver function. The present study has been planned to find out if MARS can effectively serve as a bridge therapy until liver transplantation in addition to its original use.

Who can participate?
Patients aged between 20 and 70 years with acute liver failure can take part in this study.

What does the study involve?
Patients are randomly allocated to one of two groups: the experimental group or the control group. Patients in the experimental group receive MARS treatment three times in addition to standard internal treatments. Patients in the control group only receive standard internal treatments.

What are the possible benefits and risks of participating?
All patients may find some improvement or delayed aggravation of liver failure. This research may help treatment methods in future. Patients in the experimental group may have changes in blood flow, bleeding and decreased platelet count due to using anticoagulants, which can be a risk for patients with unstable blood flow, bleeding and septic shock (a condition that arises when the blood pressure drops to dangerously low levels). Doctors will carefully observe all patients.

Where is the study run from?
Six hospitals in South Korea:
1. Seoul St. Mary's Hospital
2. Asan Medical Center
3. Soonchunhyang University Hospital, Bucheon

4. Severance Hospital
5. Seoul National University Hospital
6. Pusan National University Hospital

When is the study starting and how long is it expected to run for?
The study started in April 2013 and is expected to run until December 2014.

Who is funding the study?
Gambro Korea Ltd, South Korea.

Who is the main contact?
Dr Jong Young Choi
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Contact information

Type(s)
Scientific

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Additional identifiers

Protocol serial number
MARS01_2012

Study information

Scientific Title
A prospective study to evaluate the effect of the Molecular Adsorbent Recirculating System (MARS®) for patients with acute liver failure: a randomized controlled study

Study objectives
The study has been planned to determine whether MARS, in adherence to its original function as a liver-assisting device that aids in a recovery of liver functions, is able to effectively serve as a bridge therapy until liver transplantation.

Ethics approval required
Old ethics approval format

Ethics approval(s)
1. Seoul St Mary's Hospital, 13/12/2012, KC12DSMI0703
2. Asan Medical Center, 15/02/2013, 2013-0153
3. Severance Hospital, 21/11/2012, 1-2012-0045
4. Soonchunhyang University Bucheon Hospital, 06/11/2012, SCHBC 2012-02-015-001
5. Seoul National University Hospital, 06/01/2013, D-1210-023-430
6. Pusan National University Hospital, 21/11/2012, H-1210-001-005

Study design
Multicenter prospective open-label 1:1 randomized controlled study

Primary study design
Interventional

Study type(s)
Treatment

Health condition(s) or problem(s) studied
Acute liver failure
Acute on chronic liver failure due to hepatitis B

Interventions
Upon acquiring the consent form during the subject screening period, the investigator categorizes subjects into groups I, II, III and IV according to the severity grade of hepatic encephalopathy. Half of the subjects are assigned to the experimental group and the other half to the control group in a 1:1, random distribution. Subjects in the experimental group receive equivalent MARS treatment three times in addition to standard internal treatments depending on the study method criteria. Subjects in the control group only receive standard internal treatments. Subjects from both groups may receive subsequent surgical liver transplantation when deemed appropriate by clinicians, unless duly noted due to a potential rejection syndrome in transplantation. Liver transplantation may take place upon consulting clinicians, but it may also be postponed or halted depending on circumstances.
All subjects undergo daily clinical observations and tests for a week starting from the date of study admittance. From thenceforth, patients who have not received liver transplantation undergo clinical observations and tests on the second, third, fourth, twelfth (third month) and sixteenth (fourth month) week of the study. Patients who received liver transplantation undergo clinical observations and tests on the second, fourth, twelfth (third month) and sixteenth (fourth month) week of the study.

Random distribution methods

Random distribution is conducted via a computer system. Once the investigator inputs the data of subjects who meet the inclusion criteria, the computer system conducts a block randomization. Therefore, no one including the investigators themselves can predict which subject will receive which treatment method. The probability of a subject receiving MARS treatment or a standard internal treatment is equal. In categorizing subjects by their severity level in hepatic encephalopathy, a fixed quota is set for each level to ensure distribution.

1. Screening period
The investigator explains the clinical study and its potential risks to subjects and their guardians (legal representatives), who sign and date the consent form upon their agreement of

participation. Since subjects in the present study are unable to make decisions on their own due to hepatic encephalopathy, consent by guardians (legal representatives) is required. The subject consent form must be signed before any clinical test procedures take place. The subjects clinical test suitability is screened. This includes clinical laboratory tests on serum chemistry and hematology, analysis on neurologic conditions, special tests and, if needed, EEG. Furthermore, test results and subject information are evaluated in order to determine whether subjects are in full accordance with subject inclusion/exclusion criteria.

2. Treatment period
Upon admittance to the study, the patient is randomly assigned to either the experimental or the control group. Treatment begins within 12 hours. Patients in the control group undergo standard internal treatment. Patients in the experimental group receive three rounds of MARS treatment depending on the study method criteria. In order to apply the MARS treatment, a vascular access must be secured. Vascular access is established in the internal jugular vein, central vein or femoral vein. Upon securing vascular access, MARS® monitor (Gambro) and PRISMA®/PRISMAFLEX® (Gambro) devices are connected prior to the treatment in preparation. The dialysate circuit is primed by 0.9% saline solution. Afterwards, 500 ml 20% albumin is filled into the circuit and recirculation is conducted for over 15 minutes. Blood circuitis are primed with 0.9% saline solution using PRISMA®(Gambro)/PRISMAFLEX® and MARS® monitor devices. Once dialysate recirculation and blood circuit priming is finished, treatment commences. Treatment is conducted for a maximum of 8 hours per session. In case the treatment is discontinued due to a clot in vascular access or other filters, it may resume using new devices when deemed appropriate by the investigator. Any treatment over 5 hours long is considered to be one full round of treatment. All subjects undergo daily clinical observations and tests for a week starting from the date of study admittance. From thenceforth, patients who have not received liver transplantation undergo clinical observations and tests on the second, third, fourth, twelfth (third month) and sixteenth (fourth month) week of the study. Patients who received liver transplantation undergo clinical observations and tests on the second, fourth, twelfth (third month) and sixteenth (fourth month) week of the study.

3. Monitoring period
Subjects who have not received transplantation are traced and monitored for a year starting from the date of the study admittance. Subjects who have received transplantation are traced and monitored for a year starting from the date of the transplantation. Subjects who are to receive transplantation are traced and monitored until transplantation.

Intervention Type
Other

Phase
Not Applicable

Primary outcome(s)
6-month survival rate (measured 6 months from the enrolled date of this study)

Key secondary outcome(s))
1. In case of no transplantation, one-year survival rate from the date of admittance to the study
2. One-year survival rate post-transplantation
3. Survival period length pre-transplantation
4. An improvement in hepatic encephalopathy (using Glasgow Coma Scale in accordance with Appendix 1); measured every day during hospitalization

5. Bilirubin level improvement after MARS treatment; measured at 1 week, 2 weeks, 3 weeks, 4 weeks, 3 months and 6 months using a biochemical test
6. Laboratory parameter improvement; measured at 1 week, 2 weeks, 3 weeks, 4 weeks, 3 months and 6 months using a biochemical test

Completion date
31/12/2014

Eligibility

Key inclusion criteria
1. Acute liver failure patient in accordance with American Association for the Study of Liver Diseases (AASLD) guideline
2. Age between 20 and 70
3. Patient with a sign of hepatic encephalopathy
4. If a patient is able to make decisions on his/her own, a subjects own consent and signature is required. However, if a patient is unable to make decisions on his/her own due to hepatic coma, a consent and signature by a legal representative is required.
5. All of the above
6. Or acute-on-chronic liver failure (AoCLF) with hepatitis B including No. 2, 3 and 4 above

Participant type(s)
Patient

Healthy volunteers allowed
No

Age group
Adult

Sex
All

Key exclusion criteria
1. Acute liver failure due to acetaminophen
2. Acute hepatitis A
3. Patient with a sign of hepatic encephalopathy due to alcoholic hepatitis
4. Patient with anamnesis of chronic liver disease (except hepatitis B)
5. Among autoimmune disease patients with abrupt recurrence, those who display varix and nodularity on CT or duodenoscopy
6. Patient with anamnesis of hepatocirrhosis (except hepatitis B)
7. Septic shock
8. Patient with irreciprocal multiorgan failure
9. Abrupt bleeding
10. Pregnant or lactating women
11. Patient whose mean arterial pressure (MAP) is below 55 mmHg despite usage of hypertensor
12. Coma of non-hepatic origin
13. Uncontrollable sepsis
14. Extrahepatic cholestasis

15. Extrahepatic neoplasia
16. Patient with irreciprocal brain/organ damage leading to transplantation rejection syndrome
17. HIV hepatitis

Date of first enrolment
09/04/2013

Date of final enrolment
31/12/2014

Locations

Countries of recruitment
Korea, South

Study participating centre
222 Banpo-Daero
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Sponsor information

Organisation
Gambro Korea Ltd (Korea, South)

ROR
https://ror.org/00y1hj465

Funder(s)

Funder type
Industry

Funder Name
Gambro Korea Ltd (Korea, South), Reference No.: MARS01_2012

Results and Publications

Individual participant data (IPD) sharing plan

IPD sharing plan summary

Not provided at time of registration

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
Study website	Study website	11/11/2025	11/11/2025	No	Yes