Molecular Adsorbent Recirculating System (MARS) Therapy for Trauma Related Acute Liver Failure

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Background/Significance/Purpose

- The Molecular Adsorbent Recirculating System (MARS) is an extracorporeal liver support system that removes water-soluble and albumin-bound toxins.
- As one of the few North American centers that offers MARS therapy, this intervention has been utilized in trauma patients who suffer acute liver failure from penetrating and blunt abdominal injuries or perfusion defects.
- We report our experience using MARS for acute liver failure in a series of trauma patients.

Purpose and Specific Aims

The purpose of this study is to describe our experience using MARS for acute liver failure in a series of trauma patients and evaluate the effect on patient outcomes.

Study Design

This is a descriptive study of a subset of patients hospitalized with traumatic injuries from an institutional MARS database.

Setting

Multitrauma Critical Care unit (MTCC) at a Level I urban trauma center.

Sample

- Adult patients admitted to the trauma center that received MARS therapy from 2013-2021 were included.
- All sustained blunt or penetrating abdominal injuries or heat stroke, and had reversible causes of acute liver failure or were a candidate for liver transplant.
- Twelve trauma patients were included; 4 of the patients (33.3%) had a diagnosis of heat stroke.

Methods

- Indications for MARS were:
  - Anatomically anhepatic patients awaiting a liver transplant following severe hepatic injury
  - Patients with heat stroke and/or reversible forms of multiple organ failure with hyperammonemia, lactemia, coagulopathy, transaminitis, and requirement for vasoactive medications
- Data for trauma patients were extracted from a larger database of all patients who received MARS therapy within the institution.
- Data were analyzed with parametric and non-parametric statistics as indicated.

Results

- The median Model for End-Stage Liver Disease (MELD) score was 31 (IQR, 24-36), the mean Sequential Organ Failure Assessment (SOFA) score was 14.2 (SD, 3.8), and the mean ISS was 50 (IQR, 50-62.5).
- Mean age was 37.7 years (SD, 17.5), and 33% of all patients were women.
- A median of 3 MARS sessions were administered.
- Overall survival in the cohort was 58.3%; 3 patients (25%) required liver transplant. Predicted survival based on MELD scores was 53%.

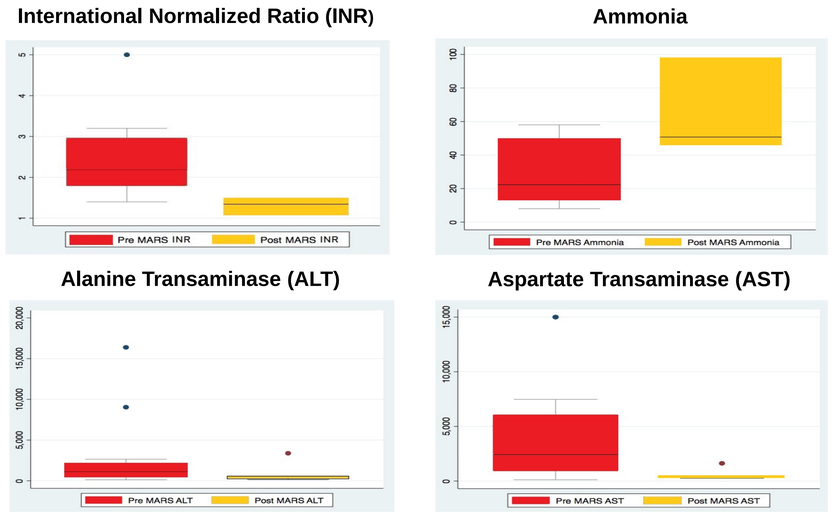

Figure 1. Median laboratory changes pre- and post-MARS.

Discussion/ Conclusion/ Implications

- We report one of the largest single-center North American series of trauma patients treated with MARS.
- Using institutional criteria and a multidisciplinary approach, MARS can improve laboratory parameters, allowing time for hepatic recovery or bridge to liver transplantation.
- This data highlights an understudied population of trauma patients receiving extracorporeal hepatic support.
- Limitations to this study include the method of sampling, as this was a convenience sample. This was also a single-center study in one urban academic medical center.
- These data add to a growing body of literature in support of MARS therapy and motivate additional clinical trials to determine which trauma patients may derive greatest benefit from this extracorporeal support modality.

Selected References

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