

Bleeding Complications Associated With the Molecular Adsorbent Recirculating System: A Retrospective Observational Study

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Research

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Abstract

Background: The molecular adsorbent recirculating system (MARS) is an artificial liver support system that supports excretory liver function in patients with liver failure and is used as bridge therapy for patients waiting for liver transplantation. However, MARS may increase the tendency for bleeding. The objective of this study was to determine how MARS affects coagulopathy and identify specific factors associated with bleeding complications.

Methods: We retrospectively analyzed data from 15 patients undergoing a total of 36 MARS sessions. Complete blood count, coagulation profiles, and blood chemistry values were compared before and after MARS. To identify pre-MARS factors associated with increased bleeding after MARS, we divided patients into bleeder and non-bleeder groups and compared their pre-MARS laboratory values.

Results: MARS significantly reduced bilirubin and creatinine levels. MARS also increased prothrombin time and activated partial thromboplastin time and reduced fibrinogen, thus negatively impacting coagulation. Seven patients had bleeding complications and were classified into the bleeder group. Pre MARS hemoglobin was significantly lower in the bleeder group (8.3 mg/dl) than in the non bleeder group (10.0 mg/dl, $P=0.014$). When comparing the upper and lower 25 % of MARS sessions based on the hemoglobin reduction rate, hemoglobin reduction was significantly greater in MARS sessions involving patients with low pre MARS hemoglobin and factor V ($P=0.008$ and $P=0.032$, respectively).

Conclusions: MARS appears to alter coagulation related factors and increase the risk of bleeding complications. However, individual differences among patients were large, and various factors, such as low hemoglobin and factor V levels, appear to be involved.

Full Text

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Figures

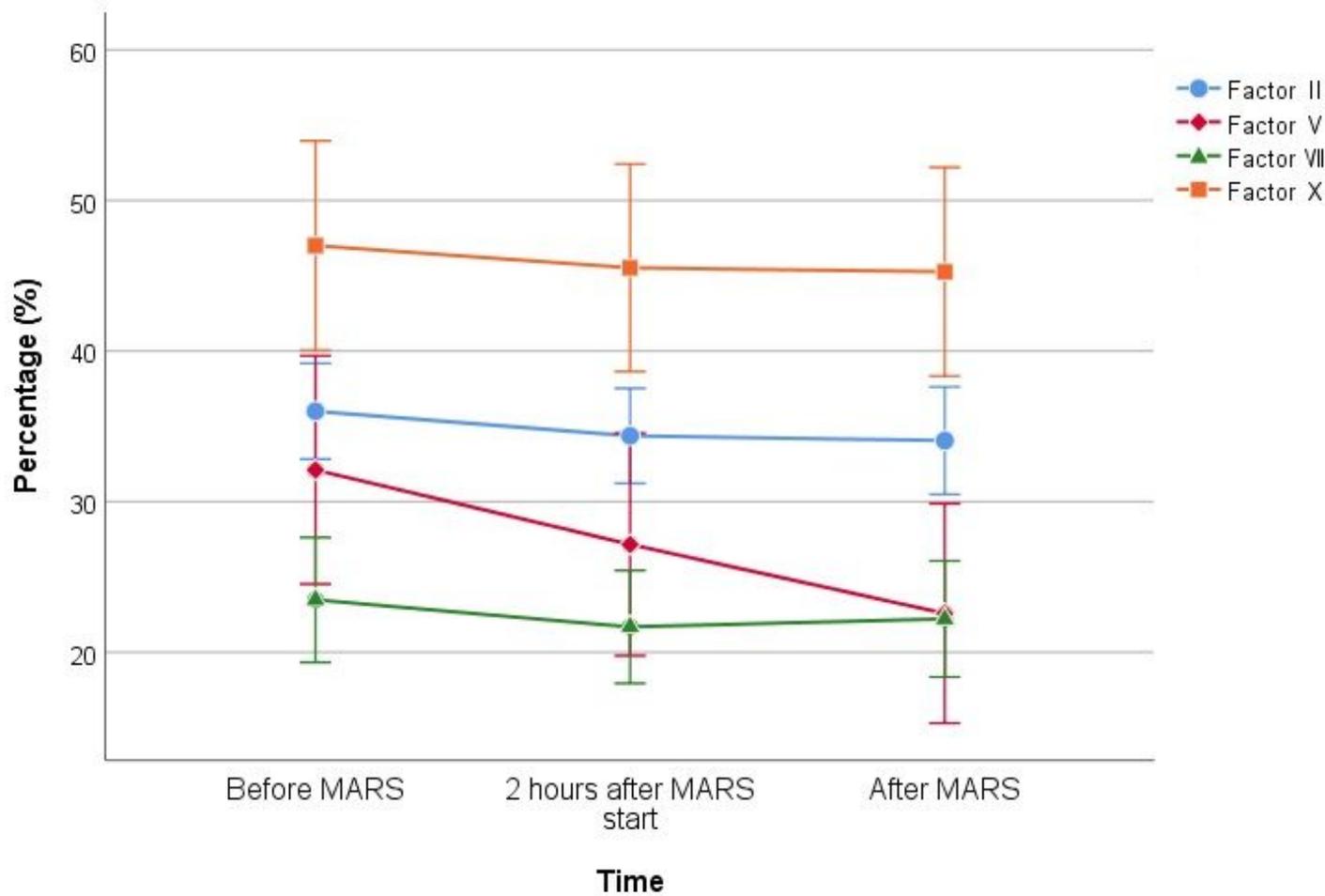


Figure 1

Sequential measurements of coagulation factors (n= 22). All factors Factor II, V, VII, and X decreased significantly over time (P=0.042, P<0.001 , P=0.006 and P=0.031 , respectively). Note that factor V sharply decreased from 33.1% before MARS to 27.2% and 22.6% after MARS start and after MARS, respectively.