Hemofiltration can effectively lower blood glutamate levels in critically ill patients

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Introduction

Excess concentrations of glutamate following acute and chronic brain insults have been shown to play a well-established role in secondary brain damage, and are associated with a poor neurological outcome. Previous studies have suggested that hemodialysis and peritoneal dialysis may be effective in reducing blood glutamate levels; however, these methods may not be viable for hemodynamically unstable patients. Hemofiltration is associated with more a favorable hemodynamic profile, longer duration, and less need for anticoagulation. This study examined whether blood glutamate concentrations could be decreased in the peripheral blood via hemofiltration. A decrease in blood glutamate levels could consequently increase the glutamate concentration gradient between the brain fluid and blood, accelerating the rate of the well-established brain-to-blood glutamate efflux..

Methods

Blood samples were taken from 10 critically ill patients immediately before initiation of hemofiltration, and after 1, 2, 4, 6 and 12 hours, for a total of 6 blood samples. Samples were sent for determination of glutamate,

glutamate oxaloacetate transaminase (GOT), glutamate pyruvate transaminase (GPT), hemoglobin, hematocrit, urea, creatinine, glucose, sodium, potassium, platelet and white blood cell (WBC) levels.

Results

There was a statistically significant reduction in blood glutamate levels by 1 hour after starting HF compared to baseline levels ($p < 0.05$). Values continued to decline, reaching significance at 4 and 6 hours after HF initiation ($p < 0.05$, Fig 1). There was no difference in levels of GOT or GPT.

Conclusions

This study demonstrates that glutamate can be cleared from the blood by hemofiltration. This suggests a potential therapeutic role for hemofiltration in reducing blood glutamate levels, especially in critically ill patients where hemodialysis and peritoneal dialysis may be contraindicated.