Effect of hemodiabsorption and sorbent-based pheresis on amino acid levels in hepatic failure.

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Changes in plasma amino acid concentrations were measured in patients with hepatic failure during extracorporeal hemodiabsorption (using the Liver Dialysis Unit, "the Unit") or hemodiabsorption plus sorbent-based pheresis treatment (using the Liver Dialysis Plasmafilter Unit, "the PF-Unit") Systems. Eight patients with hepatic failure, grade 3 or 4 encephalopathy, elevated bilirubin and/or creatinine levels and respiratory or renal failure were treated for 1-3 days with the Unit alone. Three of these were also treated with the Unit containing 10 g of BCAA in the sorbent suspension. Four patients with hepatic failure treated with the PF Unit also had 10 g of branched chain amino acid (BCAA) added to the sorbents of the Unit portion of this device. Pre- and post-plasma samples were drawn and high performance liquid chromatography (HPLC) was used to separate and detect amino acids in the plasma. Both the Unit and the PF-Unit have the capability to selectively remove various amino acids, especially aromatic amino acids (AAA). The pre-treatment amino acid profiles of plasma were typical for hepatic failure, with abnormally high levels of phenylalanine, tyrosine, tryptophan, and methionine and decreased levels of valine, leucine and isobutylcine. The average pre-treatment Fischer ratio (BCAA/AAA) for both Unit and PF-Unit patients was 1.43 (+/- 0.58). Treatments by both systems resulted in an increase of BCAA levels in blood and concomitant decrease of AAA levels, with an average Fischer ratio improvement of 30-38% for the Unit and PF-Unit without BCAA. The Fischer ratio improved by 90% (average) for the Unit with BCAA. Levels of many other amino acids (such as alanine, glycine, proline or lysine) increased during both Unit and PF-Unit treatments. The removal of strongly protein-bound toxin and amino acids such as tryptophan and sulphydryl amino acids was more effective by the PF-Unit. Both the Unit and the PF-Unit have the unique capability to remove toxic aromatic amino acids while increasing BCAA levels in patient. The increase in many amino acid levels may be related to the removal of toxins that interfere with normal amino acid metabolism. The addition of the PF module improves the removal of bilirubin and similarly protein-bound chemicals. Changes in amino acid profiles by the Unit and the PF-Unit contrast markedly with other extracorporeal devices.

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