

The effect of glutamine-supplemented total parenteral nutrition on nitrogen economy depends on severity of diseases in surgical patients

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Abstract

Background: Gln is an important substrate for enterocyte and rapid proliferation cells. Studies have shown that parenteral supplementation of Gln maintains the intracellular Gln pool, improves nitrogen balance and shortens hospital stay. However, some studies showed Gln-supplemented TPN had no effect on restoring the Gln pool in critically ill patients. Objective: To evaluate the effect of glutamine (Gln) dipeptide supplementation of total parenteral nutrition (TPN) on postoperative nitrogen balance and immune response of patients undergoing surgery. Methods: This study is a prospective, randomized double-blind clinical trial. APACHE II score and TISS were used to evaluate the patients after admission. Forty-eight patients with major abdominal surgery were allocated to two groups to receive isonitrogenous (0.228 g nitrogen/kg/day) and isoenergetic (30 kcal/kg/day) TPN for 6 days. Two groups (Conv and Ala-Gln) were further divided to high (APACHE6) and low (APACHE <6) groups. Control group (Conv) received 1.5 g amino acids/kg/day, whereas the Ala-Gln group received 0.972 g amino acids/kg/day and 0.417 g of -alanyl- -glutamine (Ala-Gln)/kg/day. Blood samples were collected on day 1 and day 6 after surgery for plasma amino acid and CD4, CD8 cell and T lymphocyte analysis. Cumulative nitrogen balance were also measured on day 2, 3, 4, 5 postoperatively. Results: Although there was a tendency to have better cumulative nitrogen balance on the postoperative days in the Ala-Gln group, no significant difference was observed between two groups. However, a better significant cumulative nitrogen balance was observed on the 2nd, 3rd and 5th postoperative day in the Ala-Gln group than in the Conv group in patients with APACHE II <6, whereas no significant difference was noted in patients with APACHE II 6. No difference in urine 3-methylhistidine excretion were observed between the 2 groups. Patients in the Ala-Gln group had significant higher T lymphocyte and CD4 cells than did those in the Conv group. Conclusion: TPN supplemented with Gln dipeptide had beneficial effect on enhancing the immune response. However, the effect of Ala-Gln administration on improving nitrogen economy was only observed in patients with

low APACHE II scores. These results may indicate that Gln required for reversing the catabolic condition may depend on the characteristics and severity of the diseases.