
Abstract
Glutamine is an essential substrate for gut mucosal structure, but the role for gut immune function is not fully known. To determine the effect on gut cytokine release in relation to bacterial translocation and gut morphology, a nonlethal hemorrhagic shock (30 min, 30 mmHg) was performed in male Wistar rats followed by 4 days of different way of feeding. A conventional total parenteral nutrition (TPN) solution was compared with an isocaloric and isonitrogenous TPN solution supplemented with alanin-L-glutamine and glycyl-L-glutamine. An enteral chow-fed control group was included. Gut mononuclear cells and splenic macrophages were obtained and endotoxin-induced supernatant tumor necrosis factor-alpha (TNF) and interleukin-6 (IL-6) bioactivity was measured. Histological specimen of the small bowel were taken and mesenteric lymph nodes (MLN) were separated. Enteral feeding following hemorrhagic shock was accompanied by a normal mucosal structure and no bacterial translocation could be detected. TPN was characterized by suppression of cytokine release in gut mononuclear cells and splenic macrophages compared with the enteral-fed control (p < .05). Decreased TNF and IL-6 release was associated with a significantly increased mucosal injury score (p < .05) and a high incidence of bacterial translocation to MLN (66%, p < .05 vs. control). Supplementation of glutamine-dipeptides did not prevent TPN-induced bacterial translocation to MLN (p < .05 vs. control) but significantly improved mucosal injury (p < .05 vs. TPN). Down-regulation of TNF release in TPN-fed rats could not be reversed by glutamine dipeptides while IL-6 release was significantly increased compared with TPN-fed animals (p < .05), and no difference to enteral-fed controls could be found. Enteral nutrition following hemorrhagic shock is superior to parenteral nutrition with regard to mucosal structure, cytokine release, and bacterial translocation. Supplementation of TPN with glutamine dipeptides could reverse TPN-induced suppression of IL-6 release and improved mucosal structure, which may be beneficial in various disease conditions in which TPN is an integrated part of patients management.