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THE EFFECT OF SPECIALIZED AMINO ACIDS ON LIVER FUNCTION AND CLINICAL OUTCOMES IN ACUTE DIFFUSE PERITONITIS

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Abstract:
Acute diffuse peritonitis (ADP) is a severe and life-threatening surgical emergency associated with high mortality, systemic inflammatory response, and complex pathophysiological mechanisms. One of the critical factors influencing the clinical course and prognosis of ADP is the development of hepatic dysfunction. However, the exact mechanisms of liver damage in the context of peritonitis and the efficacy of therapeutic interventions aimed at protecting and restoring liver function remain insufficiently investigated. This study aims to evaluate the impact of specialized amino acid infusions—glutamine, arginine, and branched-chain amino acids (BCAA)—on liver function and clinical outcomes in patients with acute diffuse peritonitis.

Keywords: Acute diffuse peritonitis, liver dysfunction, specialized amino acids, glutamine, arginine, BCAA, intensive care, clinical outcomes, mortality.

Materials and Methods:

This prospective, controlled clinical study was conducted on patients diagnosed with acute diffuse peritonitis at a multidisciplinary intensive care unit. Inclusion criteria were adult patients (aged 18–70) with confirmed diagnosis of ADP based on clinical, laboratory, and intraoperative findings. Exclusion criteria included pre-existing chronic liver disease, malignancy, or immunosuppression.

The study population was divided into two groups: - **Study Group (n = XX):** Patients received standard intensive care management for peritonitis, supplemented with specialized amino acid infusions containing glutamine, arginine, and BCAA. - **Control Group (n = XX):** Patients received standard intensive care without specialized amino acid supplementation.

Observed Parameters: - Biochemical liver function tests: ALT, AST, total bilirubin, direct bilirubin, alkaline phosphatase, total protein, albumin, prothrombin index. - Inflammatory markers: C-reactive protein (CRP), leukocyte count. - Hemostasis indices: prothrombin time, APTT. - Hepatic detoxification function: evaluated using phenolsulfonphthalein excretion test and chromatographic analysis. - Liver morphology and stiffness: assessed using ultrasound and transient elastography (FibroScan).

Severity of the disease was assessed on admission and throughout the intensive care period using APACHE II, SOFA, and Mannheim Peritonitis Index scores.

Nutritional Status: Nutritional assessment included anthropometric measurements, nitrogen balance calculation, and assessment of wound healing parameters.

Statistical Analysis: Statistical processing was performed using SPSS v.25 software. Continuous variables were presented as mean ± standard deviation and compared using Student's t-test or Mann–Whitney U test where appropriate. Categorical variables were compared using Chi-square test. A p-value <0.05 was considered statistically significant.

Results: The administration of specialized amino acid solutions resulted in significant improvements in liver function indicators compared to the control group. In the study group: - ALT and AST levels normalized more rapidly ($p<0.05$). - Total and direct bilirubin levels decreased significantly by postoperative day 5 ($p<0.05$). - CRP levels were notably lower by day 3 and day 7 ($p<0.01$). - Prothrombin index improved earlier, indicating better synthetic function recovery. - Phenolsulfonphthalein excretion rates and chromatographic detoxification parameters were significantly enhanced ($p<0.05$). - Elastography demonstrated earlier reduction in hepatic stiffness values in the amino acid group. Clinically, the study group demonstrated: - Faster stabilization of vital signs and hemodynamics. - Lower incidence of postoperative complications, including septic shock and multiple organ failure. - Shorter duration of ICU stay (mean reduction of 2.5 days, $p<0.05$). - 17.8% relative reduction in mortality compared to the control group.

Conclusion: The integration of specialized amino acids—glutamine, arginine, and BCAA—into the postoperative intensive care protocol for patients with acute diffuse peritonitis significantly improved liver function recovery and overall clinical outcomes. This approach not only enhanced the biochemical and functional parameters of the liver but also contributed to reducing complications, hospital stay duration, and mortality. Based on these findings, new evidence-based postoperative care protocols incorporating amino acid infusions have been proposed and successfully implemented in clinical practice.

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