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**NUTRITIONAL MANAGEMENT OF PATIENTS WITH SEVERE LIVER DISEASE BY USING INTRAVENOUS HYPERALIMENTATION AND ELEMENTAL DIET***

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**Summary**

Management of protein-calorie malnutrition found in 32 patients with severe liver diseases such as fulminant hepatitis and cirrhosis of the liver was carried out using 2 types of synthetic amino acid solution (Hep-OU and Fischer solution) for intravenous and enteral alimentations with rapid monitoring of serum aminogram. Intravenous hyperalimentation of these cases resulted in maintenance of nutritional status with improvement of nitrogen balance and normalization of impaired serum aminogram. During this study, however, nutritional support was initiated only when intractable ascites, upper gastrointestinal bleeding and hepatic encephalopathy were observed. In 2 cases of fulminant hepatitis with sepsis and 3 hepatoma patients with ascites, elemental diet containing maltose and amino acids was used to supply sufficient amounts of nutrients in a minimum volume of water. These techniques with simultaneous monitoring of urinary excretion of 3-methylhistidine and creatinine height index as nutritional parameters make nutritional management easy for patients with liver disease.

**Key Words:** nutritional management, liver disease, intravenous hyperalimentation, elemental diet, amino acid imbalance.

**Introduction**

Protein-calorie malnutrition is a major problem in patients with severe liver diseases such as fulminant hepatitis, decompensated cirrhosis and advanced primary hepatoma. Nutritional support should be carefully performed while considering the impaired state of protein-amino acid metabolism and the sensitive homeostasis of water and minerals in advanced liver diseases. Appropriate composition and administered dose of amino acids to normalize deranged serum aminograms is of primary importance for effective and safe nutritional management of these patients. How one can assess nutritional condition and decide the time for initiating adequate nutritional therapy has been another serious problem for clinicians dealing with liver disease. We have recently prepared 2 types of synthetic amino acid solution for patients with liver disease and been using these mixtures for intravenous hyperalimentation and elemental diet as a fundamental technique of nutritional support. The
clinical significance and technical problems of intravenous and elemental alimentations in undernourished patients with hepatic disease are presented in this study.

Subjects and Methods

The subjects studied were 10 patients with fulminant hepatitis, 23 with non-malignant cirrhosis of the liver, 14 with primary hepatocellular carcinoma, who were admitted to Okayama University Hospital and other affiliated hospitals. All patients with hepatoma had advanced cirrhosis of the liver. Diagnosis was based on liver biopsy and autopsy findings as well as clinical observations in 3 cases of liver cirrhosis. Quantitative determination of amino acids in serum, cerebrospinal fluid and urine were carried out using a Nihon-Denshi JCL-6AH or a Hitachi 034 type amino acid analyzer. Mean grades of encephalopathy and electroencephalographic finding were based on Sherlock's and Parsons-Smith's classifications, respectively.

Results and Discussion

The evaluation of dietary conditions and nutritional assessments in 22 cirrhotic patients with and without hepatoma, who were admitted to the hospitals during 1973 to 1976, revealed inadequate intake of protein, calorie and salt leading to protein-calorie malnutrition (Fig. 1). This could render the patients more susceptible to various complications such as hepatic encephalopathy and gastrointestinal bleeding. General uses of body weight, serum protein and albumin as nutritional parameters of nutrition have been found not to be suitable for patients with severe liver disease,