Abstract: The resting energy expenditure (REE) and the respiratory quotient (RQ) were measured longitudinally using indirect calorimetry to examine the effects of total parenteral nutrition (TPN) on energy metabolism in children undergoing autologous peripheral blood stem cell transplantation (PBSCT). There were six children (two males and four females) and the age ranged from five to 13 years (median, eight yrs.). The diagnosis included acute lymphocytic leukemia (ALL; 4), neuroblastoma (NBL; 1) and primitive neuroectodermal tumor (PNET; 1). TPN was started after the patients were stabilized following PBSCT (group A; n=3) or before the initiation of high dose cytoreductive chemotherapy (HCC) (group B; n=3). Duration of HCC before PBSCT was identical between the two groups (six to eight days). Average total calorie and protein intake during HCC was significantly higher for group B than for group A. The %REE, the percentage of REE to the predicted basal energy expenditure (BEE), in group A showed 133±19%, 129±14% and 146±11% during three periods of HCC (days 8 to 1 of PBSCT), bone marrow suppression (days 0 to 11 of PBSCT) and bone marrow recovery (days 12 to 22 of PBSCT), respectively. In contrast, those in group B were 10% to 20% lower than those in group A at all periods. Carbohydrate oxidation rates during HCC in group A were significantly lower than those in group B, and those were not different between both groups during post-PBSCT periods. Fat oxidation rates in both groups were similar at all stages of periods. In contrast, protein degradation rates in group A were significantly higher than those in group B at all stages of the period. From these results, we concluded that commencement of TPN administration prior to HCC in the patients undergoing PBSCT provides beneficial effects to maintain better energy metabolic and nutritional status. J. Med. Invest. 44: 199-203, 1998

Key Words: Total parenteral nutrition, peripheral blood stem cell transplantation, resting energy expenditure, respiratory quotient, nutritional support
Peripheral blood stem cell transplantation (PBSCT)

 Patients

Patients underwent PBSCT for various indications. The aim was to evaluate the impact of TPN on energy metabolism during transplants.

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Statistical analysis

1. Nutritional and metabolic status of the patients

2. %REE during HCC and PBSCT (Fig.1)

3. RQ and substrate utilization rates during HCC and PBSCT (Fig.2 and Table 2)