Resting Energy metabolism of patients with end stage liver disease and on waitinglist for a liver transplantation

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Introduction

Liver cirrhosis is present in about 80% of the patients waiting for a liver transplantation (LTx). Patients with cirrhosis often suffer from malnutrition due to metabolic complications. Formulas to estimate the resting energy expenditure (REE) are not reliable in this patient group. Either hypermetabolism, normometabolism or hypometabolism occur. Hypermetabolism can cause malnutrition and can have a negative impact on the patients outcome. The aim of this study was to assess the REE of these patients by indirect calorimetry related to the REEHB formula to identify the prevalence of hyper and hypometabolism.

Experimental Setup

A total of 33 patients with end stage liver disease who visited the livertransplant clinic in April and May 2013 were assessed. In this group 29 patients had liver cirrhosis. Their age was between 20 and 67. The REE was measured by indirect calorimetry using the Fitmate GS (Cosmed) and predicted by the Harris and Benedict formula 1984 (REEHB). Patients were classified as hypermetabolic if the ratio REE/REEHB was >120%, and as hypometabolic if the ratio REE/REEHB was <80%.

Conclusions

Our study confirmed that in patients with an end stage liver disease resting energy expenditure should be measured. The Harris Benedict formula is not suitable to detect hypo- or hypermetabolism in individuals.

Indirect calorimetry by Fitmate

\[ RQ = \frac{\text{VCO}_2}{\text{VO}_2} \]

\[ \text{RMR} = (3.9 \times \text{VO}_2) + (1.1 \times \text{VCO}_2) \times 1.44 \]

Harris Benedict (1984)

Men

\[ 88.362 + (13.397 \times W) + (4.799 \times H) - (5.677 \times A) \]

Women

\[ 447.593 + (9.247 \times W) + (3.098 \times H) - (4.33 \times A) \]

W = Weight (kg), H = Height (cm), A = Age (years)

Results

The mean measured REE was 1627 kcal/dag ( female (n=6) : 1430/man: 1681 (n=27)). The REE was overestimated by the REEHB in 24 % ( N=8) and underestimated in 6 % of the patients ( N=2) . The difference between indirect calorimetry and Harris and Benedict is significant (Wilcoxon p <0.005). The mean REE is 92% from the mean REEHB.

Reference