Comparison of Indirect Calorimetry and Prediction Equations in Estimating the Resting Energy Expenditure in Critically ill Acute Kidney Injury Patients

Balbi AL, Ponce D , Berbel - Bufarah MN, Xavier PS , Goes CR
Botucatu School of Medicine, UNESP, São Paulo, Brazil

Introduction

- The determination of energy needs is essential for the nutritional support of AKI patients. The assessment of energy needs can be measured by indirect calorimetry (IC) or estimated by using prediction equations. The precision of these formulas in critically ill patients is unclear, especially in AKI patients.
- To evaluate the resting energy expenditure (REE) of AKI patients measured by IC and compare it with the results provided by four different prediction equations.

Methods

- Patients admitted to the Clinical Hospital of Botucatu School of Medicine, São Paulo, Brazil, from September 2012 to November 2013 were evaluated. AKI patients with suggestive clinical of acute tubular necrosis were included. The REE of the patients was obtained by IC and estimated by prediction equations of Harris -Benedict x 1.25 , Faisy , Mifflin -St Jeor and Penn -State. Precision of the formulas was defined as prediction values that fell within 90% to 110% of the measured REE by IC.
- The results of clinical and nutritional characteristics of the patients were described by median or mean and standard deviation. It was adopted as statistically significant $p < 0.05$. This study received financial support from the Fundação de Amparo à Pesquisa do Estado de São Paulo (FAPESP).

Results

- Eighty patients were included, with mean age 63.7   15.8 years , male prevalence (68.7%) and 95 % of ICU stay.
- AKI associated with sepsis was the most prevalent etiology (88.8%). ATN - ISS was 0.65   0.18 , need for dialysis 81% and mortality rate of 75 % . Body mass index was 28.49   7.20 kg/m².
- REE measured by IC was 2033 (1548.5 to 2414.65 kcal / day).

Table 1- Results for equations Harris Benedict x 1.25, Mifflin , Penn – State and Faisy.

Equations	REE (kg cal/dia)	Precision (%)
Harris Benedict x 1,25	1832.1 (1570.15 to 2094.63)	27.5
Mifflin	1451.9 (1229.25 to 1609.75)	25
Penn State	1937.2 (1768.54 to 2136.05)	21.25
Faisy	1740.6 (1521.50 to 1984.20)	6.25

Conclusion

- AKI patients presented REE measured by IC of 2033 (1548.5 to 2414.65 kcal / day), higher than that estimated by the prediction equations of Harris Benedict, Mifflin , Penn -State and Faisy. All formulas underestimated REE and showed low precision in predicting the REE in AKI