

Calculating resting energy expenditure in men with HIV/AIDS

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Previous research investigating the role of resting energy expenditure (REE) in the aetiology of metabolic abnormalities and weight loss in HIV has been conflicting (1). This conflict in the literature may be a result of inadequate adjustment for body composition as the fat free mass is the primary determinant of REE and abnormalities of body composition. Both wasting of the fat free and fat mass ('lipodystrophy') are common in people with HIV/AIDS.

The aims of this cross sectional study were to:

1. To determine if resting energy expenditure accounting for fat free mass (FFM) is elevated in HIV positive males when compared with healthy controls in the era of highly active antiretroviral therapy.
2. To examine the accuracy of prediction equations for estimating REE in people with HIV.
3. To determine if REE accounting for FFM is significantly different between those HIV positive subjects reporting lipodystrophy (LD), weight loss ($\geq 5\%$) and those who are weight stable when compared with controls.

This research was conducted in both a tertiary referral hospital HIV unit and an outpatient clinic specialising in HIV care. Seventy HIV positive males were recruited and the results compared with those from sixteen healthy age matched male control subjects.

REE was measured after an overnight fast using indirect calorimetry (Deltatrac II metabolic monitor, Helsinki, Finland). Body composition was assessed using bioelectrical impedance analysis (SEAC BIM 4, Uniquist, Brisbane).

The main findings were:

1. REE when adjusted for FFM using regression residuals was greater in HIV positive subjects than controls (1735 ± 194 kcal $n = 70$ vs 1581 ± 166 kcal $n = 16$, $P < 0.05$).
2. The Harris Benedict, Schofield and Cunningham equations significantly underestimated REE in the HIV positive subjects when compared with controls and the two equations published by Melchior and colleagues in HIV positive patients overestimated REE. Therefore a new prediction equation was developed. The accuracy of the published equations to predict REE differed in the different HIV positive subgroups which reflects the heterogeneity in body composition.
3. When divided into subgroups REE adjusted for FFM was significantly greater in the weight stable HIV patients ($n = 23$, 113 ± 13 kJ/kg) than the healthy controls ($n = 17$, 100 ± 11 kJ/kg, $P < 0.05$). The differences for the groups with lipodystrophy ($n = 30$, 109 ± 12 kJ/kg) and weight loss ($n = 17$, 106 ± 11 kJ/kg) were not significant.

In conclusion, REE is significantly higher in HIV positive males when compared with healthy controls. Body composition abnormalities common in HIV make the use of standard prediction equations for estimating REE invalid.

1. Macallan DC. Wasting in HIV infection and AIDS. *J Nutr* 1999; 129: 238S–242S.