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Purpose: Undernutrition in patients with severe neurodevelopmental disabilities (DD) such as cerebral palsy is common. Because of growth retardation, spastic quadriplegia, and alterations in body composition, traditional predictive formulas for estimating energy needs in these patients are inaccurate. Unfortunately, measured resting energy expenditure (REE) of nonambulatory tube-fed adult patients with severe DD is unknown.

Methods: To determine REE, 20 patients (14 adults, six adolescents) were prospectively studied. Patients were measured at rest, in a thermoneutral environment, and steady-state measurements were obtained. Nutritional needs of the patients were met entirely by enteral tube feedings via a permanent ostomy.

Results: REE was widely distributed from 16 Kcals/kg/d to 39 Kcals/kg/d. The mean REE (888 ± 176 Kcaldd) of the patients was significantly ($p < 0.0l$) lower than predicted as estimated by the Harris-Benedict (HB) equations (1081 ± 155 Kcals/d) and World Health Organization (WHO) equations (1194 ± 167 Kcals/day). Fat-free mass (FFM), derived from anthropometric measurements, was the best indicator for predicting REE. Two equations using FFM [for the total population, REE = 15.8 × FFM (kg) + 460; r = 0.70; $p < 0.001$; and for the adults, REE = 22.3 × FFM (kg) - 9.4 × Age (years) + 557; r = 0.81; $p < 0.001$] were developed that are not significantly biased and more precise [an error where the 95% confidence interval (CI) is < 15%]

than conventional predictive formulas (CI ranging from 16% to 31% and 26% to 45% for the HB and WHO formulas, respectively).

Conclusion: Measured REE in this population is widely variable and conventional formulations generally overpredict measured REE. In the event REE cannot be measured, these formulas provide a more reasonable estimate of REE.