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Description and prediction of resting metabolic rate after stroke and traumatic brain injury.

[Frankenfield DC](#), [Ashcraft CM](#).

Source: Department of Clinical Nutrition, Penn State Milton S. Hershey Medical Center, Hershey, Pennsylvania, USA. Dfrankenfield@hmc.psu.edu

Abstract

OBJECTIVE:

To compare the effect of stroke on the metabolic rate compared with the effect of traumatic brain injury and to determine whether the metabolic rate is predictable in both types of brain injury.

METHODS:

Indirect calorimetry was conducted prospectively in mechanically ventilated patients within the first 6 d of admission to a critical care unit owing to ischemic stroke, hemorrhagic stroke, isolated traumatic brain injury, or traumatic brain injury with collateral injuries. Clinical data were collected simultaneously and a predicted value of the resting metabolic rate was calculated using the Penn State equation (using body size, body temperature, and minute ventilation).

RESULTS:

One hundred thirty patients were measured. Ischemic stroke showed a lower incidence of fever, a lower body temperature, and a lower resting metabolic rate than the other groups; whereas in hemorrhagic stroke, these variables were similar to the trauma groups. Sedation decreased the resting metabolic rate, but this effect seemed particular to the trauma patients. The Penn State equation predicted the resting metabolic rate accurately 72% of the time, and when its component variables of body temperature and minute ventilation were controlled in an analysis of variance, all the differences among the brain injury and sedation groups were eliminated.

CONCLUSION:

Stroke is a hypermetabolic event most of the time. Body size, temperature, and minute ventilation explain most of the variation in the resting metabolic rate after traumatic and non-traumatic brain injuries. The Penn State equation therefore predicts the resting metabolic rate in brain-injured patients no matter the mechanism of injury.

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