Energy Balance in Obese, Mechanically Ventilated Patients in ICU

Clinical evidence shows that overfeeding critically ill patients is associated with poor outcomes. Obesity is a major challenge in ICU patients because of the comorbidities and anomalies associated with it. Determining an appropriate dose of enteral nutrition is difficult in this patient population and the risk of overfeeding quite high.

An association between negative energy balance and increased infections has also been reported, and while underfeeding may be beneficial for these patients, it is also recognised that obese patients can be malnourished. Therefore, providing adequate nutrients to prevent malnutrition and loss of lean body mass is important in obese critically ill patients. ASPEN/SCCM guidelines recommended provision of nutrition to obese ICU patients within 24-48 hours of admission, but at the same time, they recommend that feeding be hypocaloric. They also recommend that obese patients should undergo IC and that enteral nutrition should not exceed 65 to 70% of energy expenditure. On the other hand, ESPEN guidelines recommend an isocaloric rather hypocaloric diet based on IC.

A study was conducted to compare the predicted energy requirements based on ASPEN/SCCM equations with target energy requirements based on indirect calorimetry in critically ill, obese mechanically ventilated patients. Researchers also compared actual energy intake to target energy requirements. Twenty-five patients with a body mass index ≥30.0 kg/m2 for whom enteral feeding was planned underwent IC. REE was measured by open-circuit IC while total energy intake was determined from daily input and output records. Energy and protein intake from enteral feedings was also calculated. All study participants were at low nutritional risk.

As per the results of the study, only 4 patients had a calculated energy goal between 65% and 70% of measured REE. For the ASPEN_Low predictive equation, 4% were within the target range, and no patients' calculations exceeded 70% of the measured REE. For the ASPEN_Average predictive equation, 8% were within the target range, and two patients' calculations exceeded 70% of the measured REE. For the ASPEN_High predictive equation, 12% were within the target range, and 12% had calculations that exceeded 70% of the measured REE. All the remaining calculations were less than the target range. The mean actual total energy intake and energy intake from enteral feeding alone was 57% and 52% of the target energy requirement. Only one of 25 patients' actual total energy intake exceeded the target energy requirement, and the remaining 24 patients failed to achieve the target measured energy requirement.

Overall, these findings show that the ASPEN/SCCM equations for predicting energy requirements of obese critically ill, mechanically ventilated patients in the ICU underestimated energy needs compared with 65% to 70% of the goal for the majority of patients. Despite initiation of energy feedings within 24 to 48 h of ICU admission, actual energy, and protein intake during the study period was lower than calculated energy and protein requirements. No evidence of overfeeding was found. ASPEN guideline recommended equations actually underestimated the actual energy needs of obese patients. Feeding to goal was often delayed, and the energy and protein needs of these patients were not met.

Source: Nutrition
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