

Overfeeding of a patient on antipsychotic medications identified with indirect calorimetry

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CASE STUDY

A middle-aged female patient on chronic antipsychotic medications was admitted to the hospital with severe shortness of breath and decreased responsiveness. She has been homebound and bed-bound with almost no oral intake and with poor personal hygiene for 3 months. This was accompanied by vaginal bleeding which was not treated or evaluated.

On admission, height was determined to be 160 cm, weight 50 kg (ideal body weight – 55 kg), BMI 19.5 kg/m². The initial estimated caloric requirement was 1600 kcal/day, proteins - 56 gm, fat -48 gm, carbohydrates - 242 gm

On the second hospital day, the patient was intubated due to worsening acute respiratory distress syndrome (ARDS) and was given low tidal volumes on mechanical ventilation. A CT scan done the following day confirming signs of ARDS, showed bilateral dense consolidation with bilateral effusion, hepatosplenomegaly, free fluid in the pelvis, minimal ascites, bulky uterus with clots.

She was eventually extubated after 2 ventilator days as all the weaning parameters and extubation criteria were fulfilled. She required reintubation immediately within 24 hours due to worsening oxygen saturation and objective muscle weakness. A tracheostomy was performed and weaning trials were again started. On the 17th hospital day, the patient had seizures. Metabolic parameters were corrected. CSF analysis did not reveal anything remarkable.

Difficulty on weaning was partly attributed by the attending physician to attributed to critical illness polyneuropathy, hyperthyroidism, for which she was started on medication. Physiotherapy was intensified.

Due to limb weakness and unexplained difficulty in weaning from mechanical ventilation, reassessment of total caloric intake via indirect calorimetry (E-sCOVX) on the CARESCAPE R860 ventilator was done. After three failed weaning trials and nutritional intake and support of 2500 kcal/day, indirect calorimetry showed a measure energy expenditure of 1505 kcal/day, with feeding readjusted to 1375 kcal/day. The patient was successfully weaned off the ventilator 3 days after adjustment of feeding and a total of 30 days on mechanical ventilation.





DISCUSSION

Indirect calorimetry is the gold standard for nutritional assessment for critically ill patients; predictive equations of energy expenditure have been proven to be imprecise leading to under- and overfeeding¹. In a recent review by Prieser et al (2015), one of the areas on consensus was that for critically ill patients expected to stay more than 4 days, estimation of energy expenditure requires indirect calorimetry, and cannot be reliably predicted by equations².

Psychotropic medications may have profound alterations both on metabolism and energy expenditure³⁻⁵. Antipsychotic medications can reduce energy expenditure in patients. Resting energy expenditure (REE) is lower than predicted in persons taking atypical antipsychotic medication, and weight management is a significant clinical challenge for some of them. However, to date there have been no published guidelines to assist clinicians in choosing appropriate prediction equations to estimate energy expenditure in persons taking atypical antipsychotic medications⁶.

Overfeeding medically compromised patients can exacerbate respiratory failure⁷. It also increases physiological stress and also prolongs mechanical ventilation by increasing carbon dioxide production, which increases the amount of ventilation necessary to maintain a steady state of arterial blood gases^{8,9}. In this specific case, prescribing 2500 kcal/day much higher than usual ESPEN-guideline recommended 25 kcal/day for adjustment in the setting of ARDS and sepsis may have inadvertently led to overfeeding, resulting in considerable difficulty in weaning off mechanical ventilation. Guided by indirect calorimetry, the total caloric support was reduced, and patient was then successfully weaned off the ventilator and extubated.

REFERENCES

1. Rattanachaiwong S, Singer P. Should we calculate or measure energy expenditure? Practical aspects in the ICU. *Nutrition*. 2018.
2. Preiser J-C, van Zanten AR, Berger MM, Biolo G, Casaer MP, Doig GS, et al. Metabolic and nutritional support of critically ill patients: consensus and controversies. *Critical care*. 2015;19(1):35.
3. Cuerda C, Velasco C, Merchan-Naranjo J, Garcia-Peris P, Arango C. The effects of second-generation antipsychotics on food intake, resting energy expenditure and physical activity. *European journal of clinical nutrition*. 2014;68(2):146.
4. Virkkunen M, Wahlbeck K, Rissanen A, Naukkarinen H, Franssila-Kallunki A. Decrease of energy expenditure causes weight increase in olanzapine treatment—a case study. *Pharmacopsychiatry*. 2002;35(03):124-6.
5. Fountaine RJ, Taylor AE, Mancuso JP, Greenway FL, Byerley LO, Smith SR, et al. Increased food intake and energy expenditure following administration of olanzapine to healthy men. *Obesity*. 2010;18(8):1646-51.
6. Sharpe J-K, Byrne NM, Stedman TJ, Hills AP. Resting energy expenditure is lower than predicted in people taking atypical antipsychotic medication. *Journal of the American Dietetic Association*. 2005;105(4):612-5.
7. Walker RN, Heuberger RA. Predictive equations for energy needs for the critically ill. *Respiratory care*. 2009;54(4):509-21.
8. Dark DS, Pingleton SK, Kerby GR. Hypercapnia during weaning: a complication of nutritional support. *Chest*. 1985;88(1):141-3.
9. Kan M-N, Chang H-H, Sheu W-F, Cheng C-H, Lee B-J, Huang Y-C. Estimation of energy requirements for mechanically ventilated, critically ill patients using nutritional status. *Critical care*. 2003;7(5):R108.

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