

Optimizing Energy Supply by Parenteral Nutrition in the Critically-Ill: Muscle Weakness and its Monitoring

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Critical illness is mostly defined as a life-threatening process affecting numerous systems of the body [1]. Unfortunately, despite all implemented strategies, critical illness could be associated with significant morbidity or mortality [2,3]. Although the early signs of critical illness are commonly neglected, a period of physiological weakening usually heralds the situation. Very clinical staff and even visitors play a pivotal role throughout appropriate assessment and intervention steps [4].

Muscle weakness in the critically-ill, as a major complication in ICUs, is associated with increased length of ICU stay and mortality. It has recently been suggested that substantial macronutrient deficit at early stages of the critical illness does not necessarily affect muscle wasting [5]. Numerous variables could directly contribute to the muscle weakness of the critically-ill patients following Neuromuscular Blocking Drugs (NMBDs) administration including the dosage, administration method (intermittent vs. bolus) and duration and also the approaches used for monitoring neuromuscular block depth. The latter seems to be inevitable, especially in the critically-ill patients, in order to guide the proper administration of drugs, avoid overdosing, maintain muscle activity and detect reactions among concomitant medications or pathophysiologic changes [6]. Based on the recent guidelines NMBDs are recommend to be used in critically-ill patients only when absolutely necessary, the depth of muscle paralysis be monitored to avoid overdosing and metabolite accumulation, and that drug administration be curtailed periodically to allow interruption of sustained NMBDs effect [7].

Furthermore, late parenteral regimen has also been suggested to be considered as a model of caloric restriction which would be associated with the elimination of damaged organelles [8]. However, it should be taken into consideration that insulin resistance in the critically-ill patients results in an unavoidable increase in glucose production, up to 1500 kcal/day in acute phase after injury. Therefore, the caloric debt during the acute phase of critical illness should no longer be

calculated as the difference between energy expenditure and caloric intake but rather as the difference between energy expenditure and the sum of (endogenous+exogenous) calories [9]. Consequently, it seems that early parenteral nutrition without considering the mentioned pathophysiologic changes could result in overfeeding and its complications in other organs. Hence, prior to considering supplemental parenteral nutrition in patients with insufficient intake, optimization of the tolerance to ideal feeding is recommended.

References

1. Mahmoodpoor A, Golzari SE (2013) Management of the Critically-Ill Patients: The Less Intensive, the More Vigilance-demanding. *JAMA Intern Med*.
2. Mahmoodpoor A, Golzari SE (2013) APRV Mode in Ventilator Induced Lung Injury (VILI). *ABC Med*.
3. Golzari SE, Mahmoodpoor A (2013) Decatecholaminization and Calcium Sensitizers in the Critically-Ill Patients. *Research in Cardiovascular Medicine*.
4. Mahmoodpoor A1, Golzari SE1, Asvadi Kermani T2, Saidi Hasankandi H3, Soleimanpour H4 (2013) Universal glove and gown use for healthcare workers: what is the role of visitors? *J Cardiovasc Thorac Res* 5: 173.
5. Hermans G, Casaer M.P, Clerckx P, Guiza F, Vanhullebusch T, et al. (2013) Effect of tolerating macronutrient deficit on the development of intensive-care unit acquired weakness: a subanalysis of the EPaNIC trial. *Lancet Respiratory* 1: 621-629.
6. López MP, Seiz A, Criado A (2001) [Prolonged muscle weakness associated with the administration of non-depolarizing neuromuscular blocking agents in critically ill patients]. *Rev Esp Anesthesiol Reanim* 48: 375-383.
7. Murray MJ, Brull SJ, Bolton CF (2006) Brief review: Nondepolarizing neuromuscular blocking drugs and critical illness myopathy. *Can J Anaesth* 53: 1148-1156.
8. Latronico N, Nisoli E, Eikermann M (2013) Muscle weakness and nutrition in critical illness: matching nutrient supply and use. *Lancet respiratory* 1: 589-590.
9. Vincent JL, Preiser JC (2013) Avoiding underfeeding in severely ill patients-Authors' reply. *Lancet* 381: 1811-1812.

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