

Feeding the Patient with Obesity in the Critical Care Setting: A Case-Based Application

Introduction

- According to the American Hospital Association, there are more than 106,000 ICU beds in US hospitals, almost 80% are currently filled.^{1,2}
- More than 42% of US older adults are obese, and possibly half of ICU patients are obese.³
- A study of COVID-19 cases suggests that risks of ICU admission, invasive mechanical ventilation, and death are higher with increasing BMI.⁴
- Sarcopenia, which is the gradual loss of muscle mass as a result of aging and obesity, individually contribute to poor clinical outcomes.⁵
- Sarcopenic obesity is a combination of low skeletal muscle mass coupled with high obesity and can be found in older critically ill patients and are related to

health complications and limited functionality.⁵

- Critically ill patients with sarcopenic obesity may not be viewed as at risk for malnutrition due to higher fat stores and stigma/bias associated with obesity, and therefore these patients may not receive early nutrition support.
- Care teams should view all patients as individuals and work to overcome any body weight biases among clinicians and family members that may limit treatment approaches.
- Nutrition practices within the ICU have been shown to improve patient-related outcomes, be hypocaloric, and increase protein provision.⁵



Case Study

- A 66-year-old patient with obesity (BMI=38), has COVID-19 respiratory compromise
- Admitted to ICU, intubated, prone, and placed on ventilator
- Fever, on propofol, elevated energy expenditure
- Sarcopenic obesity is likely in this individual as patients lose 2-4% of muscle mass each day in the ICU⁵

How and when to feed? See principles for feeding below.

General Principles and Goals for Feeding the Obese Critically Ill Patient^{5,6}

- Support lean body mass
- Promote anabolism and positive nitrogen balance
- Avoid overfeeding and worsening co-morbid conditions such as hyperglycemia, increased CO₂ production, fluid overload
- Promote glycemic control and wound healing
- Include an exercise program (early mobility or physical activity approaches) to optimize lean muscle mass

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How to Accomplish these Goals: ASPEN/SCCM Recommendations for Feeding Critically Ill Patients with Obesity⁶

Based on ASPEN/SCCM expert consensus, we suggest that:

- Early EN start within 24–48 hours of admission to the ICU for obese patients who cannot sustain volitional intake.
- Nutrition assessment of the obese ICU patient focuses on biomarkers of metabolic syndrome, an evaluation of comorbidities, and a determination of level of inflammation, in addition to those parameters described for all ICU patients.
- Nutrition assessment of the obese ICU patient focuses on evidence of central adiposity, metabolic syndrome, sarcopenia, BMI >40, SIRS, or other comorbidities that correlate with higher obesity-related risk for cardiovascular disease and mortality.
- High-protein hypocaloric feeding be implemented in the care of obese ICU patients to preserve lean body mass, mobilize adipose stores, and minimize the metabolic complications of overfeeding.
- For all classes of obesity, the goal of the EN regimen should not exceed 65%–70% of target energy requirements as measured by indirect calorimetry (IC). If IC is unavailable, we suggest using the weight-based equation 11–14 kcal/kg actual body weight per day for patients with BMI in the range of 30–50 and 22–25 kcal/kg ideal body weight per day for patients with BMI >50. We suggest that protein should be provided in a range from 2.0 g/kg ideal body weight per day for patients with BMI of 30–40 up to 2.5 g/kg ideal body weight per day for patients with BMI ≥40.
- If available, an enteral formula with low caloric density and a reduced NPC:N be used in the adult obese ICU patient. While an exaggerated immune response in obese patients implicates potential benefit from immune-modulating formulas, lack of outcome data precludes a recommendation at this time.
- Additional monitoring to assess worsening of hyperglycemia, hyperlipidemia, hypercapnia, fluid overload, and hepatic fat accumulation in the obese critically ill patient receiving EN.
- The obese ICU patient with a history of bariatric surgery receive supplemental thiamine prior to initiating dextrose-containing IV fluids or nutrition therapy. In addition, evaluation for and treatment of micronutrient deficiencies such as calcium, thiamin, vitamin B12, fat-soluble vitamins (A, D, E, K), and folate, along with the trace minerals iron, selenium, zinc, and copper, should be considered.”⁵

Transition Out of the ICU

- Dietitian should communicate verbally and in writing, the nutrition assessment, intervention, and progress with healthcare facility where patient is discharged.
- Avoid excessive weight loss, promote adequate protein intake and repeat estimated needs calculations.
- Optimize exercise plan to increase muscle mass, function, and ambulation.
- Include family and caregivers in plan and communication.
- Encourage receiving dietitian to monitor intake and set minimum intake level to prevent nutrition regression.

References

1. American Hospital Association. Fast Facts on U.S. Hospitals, 2021. <https://www.aha.org/statistics/fast-facts-us-hospitals>. Accessed September 17, 2021.
 2. U.S. Department of Health & Human Services. Hospital Utilization | HHS Protect Public Data Hub. <https://protect-public.hhs.gov/pages/hospital-utilization>. Accessed September 21, 2021.
 3. Centers for Disease Control and Prevention (CDC). Adult Obesity Facts. 2017–18. <https://www.cdc.gov/obesity/data/adult.html>. Accessed September 17, 2021.
 4. Kompaniyets L, Goodman AB, Belay B, et al. Body mass index and risk for covid-19–related hospitalization, intensive care unit admission, invasive mechanical ventilation, and death – United States, March–December 2020. (2021). *MMWR Morb Mortal Wkly Rep* 2021;70:355–361.
 5. McKendry J, Thomas ACQ, Phillips SM. Muscle mass loss in the older critically ill population: potential therapeutic strategies. *Nutr Clin Pract*. 2020;35(4):607–616.
 6. McClave SA, Taylor BE, Martindale RG, et al. Guidelines for the provision and assessment of nutrition support therapy in the adult critically ill patient: Society of Critical Care Medicine (SCCM) and American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.). *JPEN J Parenter Enteral Nutr*. 2016;40(2):159–211.
- Additional Reading: Martindale R, Patel JJ, Taylor B, et al. Nutrition therapy in critically ill patients with Coronavirus Disease 2019. *JPEN J Parenter Enteral Nutr*. 2020;44(7):1174–1184.