

Obesity and Nutrition in Acute Respiratory Distress Syndrome



Renee D. Stapleton, MD, PhD*, Benjamin T. Suratt, MD

KEYWORDS

• ARDS • Acute lung injury • Obesity • Nutrition • Enteral nutrition • Parenteral nutrition

KEY POINTS

- Among critically ill patients, obesity may be associated with a greater risk of development of acute respiratory distress syndrome (ARDS), but is also associated with better survival.
- Rising body mass index is associated with increased length of mechanical ventilation, intensive care stay, and hospital stay.
- Many elements of the metabolic syndrome have been implicated in the effects of obesity on ARDS risk and outcomes.
- Enteral nutrition should be used in the vast majority of ARDS patients, and the role for parenteral nutrition is extremely limited.
- Enteral nutrition should be started within 24 to 48 hours of ICU admission, and either full or trophic feedings for the first few days are reasonable.
- Consideration should be given to not monitor gastric residual volumes in most critically ill patients; new evidence suggests this is safe and does not lead to worse outcomes.

OBESITY AND ACUTE RESPIRATORY DISTRESS SYNDROME

The prevalence of obesity, especially extreme obesity (body mass index [BMI] ≥ 40 kg/m²), has been rapidly increasing for the past 2 decades in the United States and other developed countries.¹ More than one third of the American population is obese, and more than 5% is extremely obese.² The public health consequences of this rise in obesity are considerable, because obesity is associated with significant morbidities and increased all-cause mortality in both men and women.¹ However, in critically ill patients including those with acute respiratory distress syndrome (ARDS), the relationship between obesity and morbidity and

mortality seems to be more complex and at times counterintuitive. A decade of observational evidence suggests that obese patients may be at greater risk of developing ARDS and other organ failures in the intensive care unit (ICU), and of having protracted ICU and hospital lengths of stay (LOS) compared with normal weight patients. Yet, obese patients seem to have greater survival rates compared with similarly ill lean patients. Therefore, in contrast with what might be assumed by clinicians, although obesity may confer greater ICU morbidity, it seems to simultaneously decrease mortality. The mechanisms for these findings are not yet clear, but recent biologic data may begin to provide an explanation.

Disclosure Statement: Neither of the authors has any conflicts of interest.

Division of Pulmonary and Critical Care Medicine, Department of Medicine, University of Vermont, 149 Beaumont Avenue, Burlington, VT 05405, USA

* Corresponding author. 149 Beaumont Avenue, HSRF 222, Burlington, VT 05405.

E-mail address: renee.stapleton@uvm.edu

Clin Chest Med 35 (2014) 655–671

<http://dx.doi.org/10.1016/j.ccm.2014.08.005>

0272-5231/14/\$ – see front matter © 2014 Elsevier Inc. All rights reserved.

Clinical Course and Outcomes of Acute Respiratory Distress Syndrome in Obese Patients

Studies in acute respiratory distress syndrome and general critical illness: risk

Although the protective effects of diabetes against the development of ARDS were first demonstrated 15 years ago,³ little has been reported on the effects of obesity and other components of the metabolic syndrome on the development of ARDS. Obesity-associated comorbid illnesses, such as cardiovascular disease, undoubtedly increase the overall risk of developing critical illness, and recent studies have suggested that the obese are at increased risk for critical illness from infectious etiologies, such as the H1N1 influenza virus.⁴ However, obesity's effects on the relative risk of developing ARDS, independent of comorbid conditions and other confounding factors, have only recently been examined. Work by Gong and colleagues,⁵ examining a cohort of critically ill patients at risk for ARDS, suggests that the risk of developing ARDS rises with BMI, independent of severity illness, gender, diabetic status, or identified risk factor for ARDS. Obese BMI categories were associated with the development of ARDS compared with normal weight, with adjusted odds ratio of 1.66 (95% CI, 1.21–2.28) for obese and 1.78 (95% CI, 1.12–2.92) for severely obese. Additional work by this group has shown a similar association between BMI and the risk for acute kidney injury (AKI) in patients with ARDS.⁶ Interestingly, this latter study also demonstrated an association between elevated BMI and decreased 60-day mortality in patients with ARDS and acute kidney injury.

Studies in acute respiratory distress syndrome and general critical illness: outcomes

Over the last decade, a growing number of observational studies have shown that, despite having elevated risks for the development of ARDS and other organ failures, obese critically ill patients paradoxically have similar to significantly improved survival compared with normal weight critically ill patients.^{7–24} Although the majority of these reports have included general medical, surgical, and trauma ICU patients, several prior studies have specifically focused on ARDS (Table 1).^{5,6,10,17,18,25}

Of these reports, most were performed as secondary analyses of other studies of ARDS, including the Molecular Epidemiology of ARDS study,^{5,6} ARDS Network ARMA and ALVEOLI trials,^{17,25} and King County Lung Injury Project (KCLIP) in Seattle,¹⁸ and one was an observational study utilizing the Project Impact database.¹⁰ All

but one¹⁷ of these reports showed a significant association between BMI and ARDS mortality at their respective endpoints (ICU, hospital, or 28–90 days) in unadjusted analyses, in which mortality fell with rising BMI. The association between BMI and mortality was maintained after multivariate analyses in 2 of these studies,^{6,17} in which the overweight and obese subjects were found to have reduced mortality compared with normal weight subjects, except possibly for those with a BMI of greater than 50 kg/m²,¹⁰ suggesting a 'J-curve' relationship between BMI and mortality. Three studies^{5,10,18} also examined LOS and discharge disposition in their cohorts. Of these, 2 showed significant associations between rising BMI and the duration of mechanical ventilation, ICU, and hospital LOS, and the likelihood of subsequent discharge to a rehabilitation or skilled nursing facility.^{5,18} Although in aggregate these studies do not yield a clear picture of BMI's effects on mortality, it is worth noting that the studies finding either no association between BMI and mortality or a loss of such association after multivariate analyses examined cohorts with relatively lower mean BMIs compared with the studies that showed significant associations. Thus, what can be surmised to date is that obesity has consistently been shown not to increase the risk of death from ARDS, and may even be protective in this disease.

In addition to these studies and many others that have examined general ICU patients, 3 meta-analyses^{26–28} and a large observational study of outcomes in obese critically ill patients²³ have recently been published. The metaanalyses included 62,000 to 88,000 subjects from up to 22 published studies and found that critically ill overweight and obese subjects had significantly lower hospital mortality compared with normal weight subjects. The Dutch National Intensive Care Evaluation (NICE) observational study examined more than 154,000 critically ill patients from 1999 to 2010 and found a significant association between BMI and mortality, with an adjusted odds ratio that ranged from 0.86 to 0.96 in the overweight, obese, and severely obese BMI categories using a reference BMI of 25, whereas the adjusted OR for subjects in the normal BMI range was 1.07. As seen in several other studies, a slight upslope in mortality ('J curve') was noted as BMI rose above 40 kg/m² in this study, but it remained below that seen in the normal BMI range.

In summary, current evidence suggests that overweight, obese, and extremely obese critically ill patients may be at greater risk for the development of ARDS and may experience greater associated morbidity including ICU LOS and duration of mechanical ventilation with ARDS, yet these

Download English Version:

<https://daneshyari.com/en/article/4207227>

Download Persian Version:

<https://daneshyari.com/article/4207227>

[Daneshyari.com](https://daneshyari.com)