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Co-morbidity or Covert Advantage? The Obesity Conundrum

Hannah Wunsch, MD MSc

Department of Anesthesiology, College of Physicians & Surgeons, Columbia University, New York, NY USA; Department of Epidemiology, Mailman School of Public Health, Columbia University, New York, NY USA

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We are taught in medical school to use comorbidities to help frame our understanding of the patient under our care. Many healthcare providers instinctively view a high body mass index (BMI) as a factor that may negatively impact a patient's long-term health trajectory, and certainly one that predicts a difficult course if seriously ill in the ICU. For example, obesity appears to be a true co-morbidity for those who contract influenza (1). But, consistently, accumulating data suggest that in the general context of critical illness obesity may have a protective effect in the short-term – the “obesity paradox” (2, 3). Less well understood are the consequences of obesity for patients who are recovering after hospital discharge. There are several (unproven) reasons to assume obese patients might have higher mortality and more difficulties. For example, obese patients may struggle to participate in physical therapy, which appears to help decrease long-term mortality (4); obesity may complicate wound healing for abdominal or other wounds; or, it may make individuals more susceptible to atelectasis and pneumonia because of lower thoracic compliance.

In this issue of *Critical Care Medicine*, Prescott et al provide data from a 1-year mortality and resource study of obese patients (vs. normal weight) patients who were admitted to the hospital with severe sepsis (5). They report that the adjusted odds of death at 1 year after hospital discharge for obese patients was half that of normal weight patients – an effect present across all ages and obesity classes (5). The authors made use of the Health & Retirement Study (HRS), an ongoing, nationally representative, cohort study of older Americans that includes information on health and functional status and also allows for linkage with Medicare data to provide information on hospitalizations and healthcare resource use. One great strength of the HRS is the ability to have information on a person *before* a critical illness (6), and especially important for this study is the availability of height and weight estimates. In their cohort of 1,404 people hospitalized with severe sepsis, 50% were admitted to an ICU, and 25% received mechanical ventilation. For those who survived to hospital discharge (n=1,087), the one-year mortality ranged from a high of

Address for Correspondence: Hannah Wunsch, MD MSc, Department of Anesthesiology, Columbia University, 622 West 168th St, PH5-527D, New York, NY 10032, USA, Tel: +1 212-305-0679, Fax: +1 212-305-8287, hw2125@cumc.columbia.edu.

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62.0% for normal weight patients (BMI 18.5–24.9) down to 44.7% for severely obese patients (BMI ≥ 35.0). Although functional disability was more prevalent in the obese population before sepsis, there was no increase in limitations in this group after sepsis.

The data on healthcare utilization were more complex. Previous studies have been mixed as to whether obese patients “use” more healthcare resources when critically ill (2). Again, counter to general assumptions, healthcare utilization before hospitalizations in this study was no greater for patients with higher BMI. After the hospitalization, obese patients had more hospital readmissions and spent more days admitted to an inpatient facility. However, this finding was explained by the fact that obese patients survived for longer and therefore had more time to use these resources.

Although they adjusted for known differences between groups, the authors recognize that not all sepsis is created equal. For example, patients with higher BMI were more likely to have renal injury as their sepsis-defining organ dysfunction (5), and it is known that such patients tend to have better outcomes (7), raising the concern of residual confounding. Additionally, obese patients may have been treated differently because of their size or the cause of their sepsis (3), and it is possible that some of the mortality reduction may be attributable to such sepsis-associated differences. However, as the findings of this paper are in line with other data from intensive care, and from broader general population cohorts (8, 9), it is unlikely that all of the mortality difference may be accounted for by differences in sepsis or treatment.

These data provide important information about long-term outcomes after critical illness, but still cannot tell us “why” obesity continues to exert protection in the short- or long-term. While still an alarming number, less than 25% of the patients hospitalized with severe sepsis were classified as obese. Given the continued risk of death associated with severe sepsis and septic shock – over 60% of normal weight patients were dead by the end of one year – perhaps we can use these important findings as a spring-board to determine the beneficial mechanisms associated with additional body weight, and ultimately “protect” all those with sepsis. At the very least, this study adds to the compelling evidence that it may be time to remove obesity from the top of the comorbidities list in the ICU and after hospital discharge.

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