


Does Coronavirus Disease 2019 Disprove the Obesity Paradox in Adult Respiratory Distress Syndrome?

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TO THE EDITOR: We are writing in reference to the editorial “COVID 19 and the Patient with Obesity – The Editors Speak Out” (1). Obesity is associated with a decrease in mortality in patients with acute respiratory distress syndrome (ARDS) and this is referred to as the obesity paradox (2). ARDS is a type of respiratory failure characterized by rapid onset of widespread inflammation in the lungs and is usually the result of infectious or chemical injury. The obesity paradox in patients with ARDS has been investigated by Ni et al. (2), who conclude that obesity and morbid obesity were associated with a lower mortality rate in patients with ARDS.

One pathophysiological mechanism postulated to explain the decreased mortality in critically ill patients with obesity is preconditioning, a chronic pro-inflammatory status in obesity that creates a protective environment, limiting the detrimental effects of a more aggressive second hit, such as ventilator-induced lung injury or sepsis (3).

A number of studies have identified a higher BMI as a risk factor for severe disease in patients with coronavirus disease 2019 (COVID-19). Peng et al. (4) conducted a retrospective analysis on 112 patients with COVID-19 and cardiovascular disease in Wuhan. The BMI of the group in the intensive care unit was significantly higher than that of the group with general hospital admissions (25.5 [23.0-27.5] kg/m² vs. 22.0 [20.0-24.0] kg/m², $P = 0.003$).

Patients were further divided into a nonsurvivor group ($n = 17$) and a survivor group ($n = 95$). Among the nonsurvivors, 88.2% (15 of 17) of patients had BMI > 25 kg/m², which was significantly higher than that of survivors (18.9% (18 of 95), $P < 0.001$).

Wu et al. (5) found that a group with severe COVID-19 had significantly higher mean BMI values than a group of patients with mild disease (25.8 ± 1.8 vs. 23.6 ± 3.2 kg/m², $P = 0.005$).

What could be causing the apparent difference in the severity of COVID-19 in patients with obesity compared with previous studies of ARDS in patients with obesity? Clinicians tend to consider patients with obesity at higher risk of worse outcomes; thus, this might result in earlier admission to the intensive care unit for monitoring purposes in normal circumstances (6). In this current pandemic, clinicians are not afforded this luxury.

Patients with obesity have reduced chest-wall elastance and lower total respiratory system compliance, with a decreased expiratory reserve volume. Difficult airway management, as well as this altered lung and chest-wall physiology, in combination with positional gas trapping is routinely encountered in patients with obesity (6).

Prone positioning appears to be critical to success in ARDS, which is likely to be difficult in patients with obesity because of staff and equipment shortages in this pandemic situation. Furthermore, right ventricular (7) dysfunction seems to be an issue in patients with COVID-19, and patients with obesity may be at increased risk because of impaired right ventricular contraction due to higher circulating plasma volume, increased sympathetic nervous system activation, and metabolic dysregulation driving higher filling pressures.

We do not know whether the obesity paradox has been broken by COVID-19. Patients with obesity may be less affected by aspects of COVID-19, harder to treat because of obesity-related factors, and at greater risk because of obesity-related vulnerabilities. Taken together, these elements may contribute to difficulties for patients with obesity in accessing care during a pandemic if they are wrongly perceived by clinicians and policy makers to be at a higher risk for worse outcomes. **O**

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