Obesity and its Implications for COVID-19 Mortality

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A recent JAMA viewpoint regarding fatalities In Italy associated with the COVID-19 pandemic failed to mention obesity as one of the pre-existing diseases associated with death.[1] It seems likely that the increased prevalence of obesity in Italy older adults compared to China may account for the differences in mortality between the two countries. Furthermore, the rising prevalence of obesity in the US and prior experience of the impact of obesity on mortality from H_1N_1 Influenza should increase the sensitivity of clinicians caring for patients with obesity and COVID-19 to the need for aggressive treatment of such patients.

Between April 2009 and January 2010, the CDC estimated that 41-84 million people were infected with the H_1N_1 Influenza virus, and that between 180,000 and 370,000 infected patients were hospitalized with 8000-17,000 deaths.[2] Several reports from around the world identified obesity and severe obesity as risk factors for hospitalization and mechanical ventilation. For example, in California between April and August 2009, 1088 patients with H_1N_1 Influenza were either hospitalized or died.[2] Of 268 patients $\geq$20 years old in whom BMI was calculated, 58% had obesity (BMI $\geq$30) and 67% of those had severe obesity (BMI $\geq$ 40). Sixty-six percent of those with obesity also had underlying diseases, such as chronic lung disease, including asthma, cardiac problems, or diabetes. Among hospitalized patients in New Mexico in 2009,[4] 46% had obesity and 56% of those requiring mechanical ventilation had severe obesity. Rates of H_1N_1 hospitalizations were significantly greater among American Indians, African Americans and Hispanics than among non-Hispanic whites, possibly reflecting the increased prevalence of obesity in those populations. The distribution of obesity among hospitalized patients in California and New Mexico exceeded the 35% prevalence of obesity in US adults in 2009-2010

The disproportionate impact H_1N_1 Influenza and now COVID-19 in patients with obesity and severe obesity is not surprising given the impact of obesity on pulmonary function. Obesity is associated with decreased expiratory reserve volume, functional capacity and respiratory system compliance. In patients with increased abdominal obesity, pulmonary function is further compromised in supine patients by decreased diaphragmatic excursion, making ventilation more difficult. Furthermore, increased inflammatory cytokines associated with obesity may contribute to the increased morbidity associated with obesity in COVID-19 infections.

Although the effects of COVID-19 on patients with obesity have not yet been well described, the H_1N_1 Influenza experience should serve as a caution for the care of patients with obesity, and particularly patients with severe obesity. The prevalence of adult obesity and severe obesity in 2017-2018 has increased since 2009-2010 and is now 42% and 9% respectively.[5] These observations suggest that the proportion of patients with obesity, severe obesity, and COVID-19 infections will increase compared to the H_1N_1 experience, and the disease will likely have a more severe course in such patients. These observations also emphasize the need for increased vigilance, priority on detection and testing, and aggressive therapy for patients with obesity and COVID-19 infections.

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