

Being overweight increases the risk of COVID-19 complications

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Several recent studies show that obesity is an important risk factor for the most serious clinical complications associated with severe forms of COVID-19.

According to recent estimates, 95% of people who died from COVID-19 had at least one pre-existing chronic disease, whether it is type 2 diabetes, cardiovascular or pulmonary disease or cancer (1). Since the incidence of these diseases increases enormously during aging, this largely explains why older people are more at risk of dying from this disease, especially when they are already weakened and / or hospitalized at the time of the infection, as in long-term care residences (CHSLDs). It is not age that is responsible for the vulnerability of the elderly, but the fact that their health is generally poorer than in the rest of the population, because chronic diseases have had more time to express their harmful consequences on health.

OBESITY AT RISK

As the pandemic progresses, however, it is becoming increasingly clear that old age is not the only risk factor for being severely affected by COVID-19. Several recent studies have notably reported that an abnormally high proportion of younger hospital patients (60 years old) were overweight and that this overweight increases the risk of complications from COVID-19. For example, a French study showed that 85% of patients with the disease who were treated in intensive care were overweight, and that patients with a BMI > 35 kg / m² (severe obesity) had a risk seven times higher to require mechanical ventilation than normal weight patients (2).

In the United States, patients under the age of 60 who were obese (BMI 30-34) were found to be twice as likely to be admitted to intensive care compared to normal weight patients, an increase in risk which reaches 4 times for morbidly obese (BMI > 35) (3). The very high incidence of obesity in certain segments of the American population (almost 80% among African-American women, for example) could therefore explain the high proportion of Covid-19 cases currently observed among these ethnic minorities.

MECHANICAL AND METABOLIC PROBLEMS

The first factor explaining this link between overweight and the severity of Covid-19 is purely mechanical: the rib cage of obese patients is compressed by excess fat, which reduces the functional capacity of the lungs. Breathing can be further compromised by excess weight in the abdomen which will hinder movement of the diaphragm, especially when lying down. In other words, the lungs of obese people do not function optimally and are therefore more susceptible to lung infections. It should also be noted that this phenomenon associating overweight and viral infections is not restricted to Covid-19, but has also been observed for respiratory



tract infections caused by other viruses (influenza H1N1, for example)

The second factor linking overweight and severity of viral infection is biochemical. Obesity is an important risk factor for type 2 diabetes and metabolic syndrome, two conditions that increase the risk of dying from Covid-19 by 10 times (4). This is most likely due to the chronic inflammation caused by excess fat which disrupts the immune response to the virus by causing exaggerated production of inflammatory cytokines. This phenomenon, called "cytokine storm", is now recognized to contribute to the rapid degradation of physiological functions (heart, kidney, brain) which is frequently observed in patients with severe forms of Covid-19 and which leads to an unprecedented increase in deaths of intubated patients in intensive care units.

We have mentioned this several times, but it must be repeated: obesity is not a question of aesthetics, but rather an overall health problem. The metabolic disturbances that are associated with overweight disturb the normal balance of physiological functions and make the body vulnerable not only to the development of several serious pathologies (diabetes, cardiovascular disease and cancer), but also to complications that arise from viral infections.

- (1) Chow N et al. Preliminary estimates of the prevalence of selected underlying health conditions among patients with coronavirus disease 2019 - United States, February 12–March 28, 2020. *MMWR Morb Mortal Wkly Rep* 2020; 69: 382.
- (2) Simonnet A et coll. High prevalence of obesity in severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) requiring invasive mechanical ventilation. *Obesity*, (published online Apr 9th, 2020).
- (3) Lighter J et coll. Obesity in patients younger than 60 years is a risk factor for Covid-19 hospital admission. *Clin. Infect Dis.*, (published online Apr 9th, 2020).
- (4) Bornstein SR et coll. Endocrine and metabolic link to coronavirus infection. *Nature Rev. Endocrinol.*, (published online Apr 2nd, 2020).