

# **High prevalence of obesity in severe acute respiratory syndrome coronavirus-2 (SARS-CoV2) requiring invasive mechanical ventilation**

## **Summary**

### **Introduction**

- The relation between obesity and severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) has not been fully documented
- Patients at risk for coronavirus-2 have pre-existing diseases such as hypertension, cardiovascular disease, diabetes, chronic respiratory disease, or cancer. Surprisingly, body mass index (BMI) was rarely mentioned among the significant clinical risk factors for SARS-CoV-2 reported in early clinical reports from China, Italy, or the United States
- Obesity has been previously recognized as an independent predisposition factor for severe H1N1 pulmonary infection
- Information about the clinical characteristics of infected patients who require intensive care is limited and the relationship between obesity and SARS-CoV-2 is unclear
- Disease severity was associated with increased body mass index categories, being maximal in patients with a BMI  $\geq 35$  kg/m<sup>2</sup>.
- The need for invasive mechanical ventilation was associated with severe obesity and was independent of age sex , diabetes, and hypertension

### **Study design**

- Retrospective cohort study, all consecutive patients admitted to intensive care for SARS-CoV-2, in Roger Hospital, between February 27th and April 5th, 2020
- All patients were diagnosed with COVID-19 pneumonia according to WHO interim guidance with SARS symptoms
- Throat swab samples were obtained from all patients at admission and tested using real-time reverse transcriptase– PCR assays
- Study participants were also compared with a historical control group composed of 306 patients admitted to intensive care at our institution for a nonSARS-CoV-2 related, severe acute respiratory disease, during the year 2019.

### **Study outcomes**

- Primary outcome - Prevalence of patients receiving invasive mechanical ventilation (IMV) following admission to intensive care
- The use of IMV was determined when oxygen therapy ( $\geq 10$  L/min) with target  $spO_2$  (90-94%) was ineffective, and when respiratory rate was above 25/min, with signs of acute respiratory failure, despite maximal oxygen therapy

## Results

- Unexpected **high** frequency of obesity among patients admitted to intensive care for SARS-CoV-2
- 47.5% presented with obesity ( $BMI \geq 30$  kg/m<sup>2</sup>), including class II obesity ( $BMI$  35-39.9 kg/m<sup>2</sup>) in 13.7% and with class III obesity ( $BMI \geq 40$  kg/m<sup>2</sup>) in 14.5%
- The distribution of BMI categories was markedly different than the distribution observed in control subjects admitted during the previous years in intensive care for severe acute pulmonary condition, in the same institution
- In non SARS-CoV-2 patients, the prevalence of obesity was 25.8%
- **Importantly, this study showed that the need for IMV, a robust proxy for the severity of SARS-CoV-2, gradually increased with body mass categories, reaching nearly 90% in patients with a BMI > 35 kg/m<sup>2</sup>**

**Strength of study:** Cohort design and enrolment of all consecutive patients admitted in intensive care for SARS-cov-2 during the study period

**Limitations** - retrospective nature and the limited number of patients enrolled

## Take home message:

- This cohort study showed that obesity is a risk factor in disease severity of SARS-CoV2, having greatest impact in patients with a  $BMI \geq 35$  kg/m<sup>2</sup>
- Patients with obesity and especially those with severe obesity should take extra measures to avoid COVID-19 contamination by enforcing prevention during the current pandemic
- Patients with severe obesity should be monitored more closely