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## Relationship between obesity, diabetes and ICU admission in COVID-19 patients<sup>☆</sup>



### Relación entre obesidad, diabetes e ingreso en UCI en pacientes COVID-19

To the Editor:

Based on initial evidence about this pandemic, the older population and/or those with associated chronic pathology (high blood pressure, diabetes, obesity...) have been identified as being more likely to develop more severe clinical forms of the infection. Obesity as a risk factor and predictor of COVID-19 infection severity is being reported by some studies, but there is still a great lack of evidence. Even so, it has been postulated as an independent risk factor for COVID-19 since it was recognized as such during the 2009 H1N1 pandemic. Our objective is to study the relationship between obesity, the need for oxygen therapy with a reservoir (non-rebreather) mask, and the need for ICU, as well as to analyse the cardiovascular profile of patients who have required hospital admission for COVID-19 pneumonia.

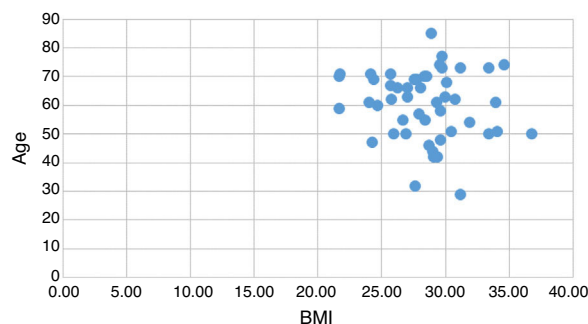
A retrospective and descriptive cohort study of 49 consecutive patients admitted to the Internal Medicine hospital ward for COVID-19 infection at the Toledo Hospital Complex was conducted from 23rd March to 14th April 2020. Variables were collected on cardiovascular disease, need for a reservoir (non-rebreather) mask and admission to the ICU. According to the body mass index (BMI), overweight was defined for values from 25.0 to 29.9 kg/m<sup>2</sup> and obesity for BMI >30.0 kg/m<sup>2</sup>.

57.14% were male, the mean age was 60.30 years (SD 11.88) and the mean BMI of 28.40 kg/m<sup>2</sup> (SD 3.34). 59.2% were overweight and 24.5% were obese. The prevalence of hypertension was 48.98%, that of dyslipidaemia was 38.78% and that of diabetes mellitus was 18.37%. 38.78% required a mask with a reservoir and 28.57% were admitted to the ICU. The mean BMI of the patients who required a reservoir mask was 28.74 kg/m<sup>2</sup> (SD 3.169), compared to 28.19 kg/m<sup>2</sup> (SD 3.493) in those who did not need it, resulting in a difference of 0.98, with a CI 95% between  $\downarrow$ 2.54 and 1.43. Regarding the patients who required admission to the ICU, a mean BMI of 28.16 kg/m<sup>2</sup> (SD 3.240) was obtained, compared to 28.50 kg/m<sup>2</sup> (SD 3.432) of those who did not require one, resulting in a difference of 1.06, with a 95% CI between  $\downarrow$ 1.80 and 2.49. No statistically significant relationship was obtained between the need for a reservoir mask and the variables BMI, hypertension, dyslipidaemia, and diabetes. Regarding the need for admission to the ICU, its association was statistically significant with diabetes mellitus ( $p=0.037$ ), but not with the rest of the variables analysed (multivariate analysis).

According to the literature, higher mortality has been observed in a diabetic population with COVID-19 over 65 years of age. The largest study reported from China (72,314 cases) showed an increased incidence of mortality in diabetic patients with COVID-

19 (2.3% over 7.3%).<sup>1</sup> Our study also found a significant relationship between diabetes and the need for admission to the ICU. Regarding obesity, several studies carried out in China, Italy and the United States have demonstrated that this population is more likely to be infected by the virus and more likely to develop more serious pneumonia, complications and death, as well as a greater risk of developing a more virulent strain and prolonging the time of infection to the rest of the population.<sup>2</sup> Similar data have been obtained in France, demonstrating that a BMI  $\geq 35$  kg/m<sup>2</sup> is an independent factor of severity in COVID-19 infection.<sup>3</sup> However, there are conflicting results on obesity. Our sample did not show a greater need for oxygen therapy with a reservoir mask nor a greater need for ICU admission for subjects with a higher BMI, in accordance with studies such as those by Li et al. and Qingxian et al., that do not establish a link between obesity and the severity of COVID-19 pneumonia.<sup>4,5</sup> A limitation of this study is the high prevalence of overweight in the population under study, which provides us with a very homogeneous sample with little dispersion (BMI 28.40 kg/m<sup>2</sup> [SD 3.34]) (Fig. 1) and that can lead to contradictory findings.

To conclude, this study has not been able to establish obesity as a factor influencing COVID-19 infection, in terms of requiring admission to the ICU and/or the need for oxygen therapy supplementation with a reservoir (non-rebreather) mask, but an association between diabetes and admission to the ICU has been demonstrated.



**Figure 1.** Dispersion table of BMI and age variables in the sample. The homogeneity of the sample is observed, with little dispersion.

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## Conflict of interests

The authors declare no conflict of interest.

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## Viral etiology of exacerbations of patients with chronic obstructive pulmonary disease during the winter season<sup>☆</sup>



### *Etiología viral de las exacerbaciones de los pacientes con enfermedad pulmonar obstructiva crónica en la época invernal*

Dear Editor,

Chronic obstructive pulmonary disease (COPD) is a chronic inflammatory process that alters the patient's functional capacity. It is estimated to be the fourth leading cause of death worldwide, affecting 2.4% of the population.<sup>1</sup> COPD exacerbations (COPDE) constitute the main complications of this disease since they deteriorate lung function. These acute processes have multifactorial causes, including viral infections, especially during the winter season.<sup>1,2</sup>

Chronic inflammation caused by viral infection and stimulation of IL-8 and other cytokines appear to be the cause of COPDE and lung lesions.<sup>3</sup> The viral impact in these processes has been underestimated until now due to the detection techniques used; the current use of molecular techniques has demonstrated the leading role of viruses in these episodes. With this technology, different studies have demonstrated viral infection in between 30 and 40% of COPDE cases, primarily involving rhinovirus, influenza and respiratory syncytial virus (RSV).<sup>3,4</sup>

The incorporation of molecular techniques in the diagnosis of viral infections has allowed us to study their participation in acute COPDE cases.

We report a prospective study conducted during the period with the highest prevalence of this type of infection (from October 2018 to February 2019). One hundred and eighty-seven patients (79% men) who came to the emergency department with an exacerbation (cough, expectoration and respiratory distress) of their previously diagnosed COPD were analysed during the study period.

A single throat swab culture was performed in each patient to detect bacteria and viruses. The viruses were studied using a commercial real-time RT-PCR (Allplex Respiratory Assay, Seegen, South Korea) that simultaneously and differentially detected 16 different viruses.

One hundred and four (104) positive samples (55.6%) were detected in the 187 patients, of which 78 (41.7%) corresponded to viruses alone, 19 (10.1%) to bacteria alone, and 7 (3.7%) to viruses and bacteria together. That is, viruses represented 45.4% (85 cases) of all respiratory processes in these patients. Differences in viral aetiology were observed in each of the months studied: with 36.6% in November and 69.7% in December. Similarly, the percentage of viral infections as the sole cause of COPDE has also fluctuated: it was 60% in October and 94.4% in February.

The main viruses detected have been rhinovirus (30.5%), influenza A (H3N2) (28.2%), RSV-B (22.3%), coronavirus (16.4%), adenovirus (1.1%) and metapneumovirus (1.1%). The bacteria detected were mainly *P. aeruginosa* and *H. influenzae* and, of the 7 virus–bacteria associations, rhinovirus represented the majority of them (57%). Five patients (5.8%) with influenza A (H3N2) infection required admission to the ICU; no patient died as a result of viral infection.

A recent meta-analysis on the prevalence of viral infections in COPDE showed that a virus can be detected in up to 50% of cases if molecular techniques are used.<sup>1–4</sup> In our study, positive results for viruses reached a total of 45.4%, a value that is within the range reported. Our study simultaneously analysed the presence of bacteria, although they have represented only 10.1% of the cases. Whether they are simple colonizers or true pathogens cannot be determined.<sup>2,5</sup>

Rhinoviruses have been the most commonly detected viruses, which coincides with other studies that estimate them at up to 58%,<sup>1,2</sup> although in the winter season there is a high circulation of these viruses associated with the common cold. As expected, influenza viruses, in this case circulating A (H3N2), and RSV have been the cause of 50.5% of COPDE cases. Viral aetiology distribution data similar to ours have already been described, although with variations depending on the type of influenza circulating in a given winter epidemic.<sup>1–4</sup>

Rapid identification of the viral aetiology of COPDE cases avoids the unnecessary administration of antibiotics and anticipates a good prognosis. Of the main viruses involved, only influenza could be prevented by systematically vaccinating these patients each season.

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