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Case Study
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Obesity - COVID-19 and Mechanical Ventilation of Intubated Patient

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Abstract

Obesity as a disease causes a restrictive lung disease and is a sufficient predisposing factor for difficult ventilation of the patient in the ventilator. In addition to covid-19, the phenomenon of "hard lung" is observed as the ventilation of intubated patients is very arduous and recruitment requires a lot of effort. The combination is quite difficult as these patients oppose the ventilator. This paper aims to explore the link between obesity and mechanical ventilation in COVID-19 patients.

Keywords: Obesity; COVID-19; Respiratory rate; Immune system

Introduction

The prevalence of adult obesity and severe obesity in 2017 to 2018 has increased since 2009 to 2010 and is now 42% and 9%, respectively [1]. Obesity is a global disease with at least 2.8 million people dying each year as a result of being overweight or obese according to the world health organization figures. Obesity is affecting most of the physiological processes and modifying the functions of the system including the immune system [2]. It is crucial to understand the effect of obesity on the course of infection to prevent or mitigate the morbidities and mortality [3,4]. In the current COVID-19 era, bariatric teams are aware of the potential risks and thus stressing the extra caution and appropriate management of these patients [5]. Knowing the scale of the obesity problem in the world, we anticipate difficult times for this group of patients in Europe, America, Middle East and rest of the world with a high rate of obesity [6]. In 2009, a significant percentage of admissions to the hospitals and mortality because of H1N1 *Influenza A virus* infection was due to obesity, an estimated 151,700 to 575,400 total deaths was reported [7,8].

Case Presentation

A 55-year-old man, with a body weight of 130 kg and active COVID-19 was intubated and put into mechanical ventilation with model ACV, FiO_2 70% which gradually dropped to 50%, PEEP 18 which gradually dropped to 14, Tidal Volume 500 ml which gradually dropped to 480 ml and respiratory rate 30/min which gradually dropped to 25/min, and I:E ½ to 1/3 and finally to 1/4. Suppression of the patient was achieved by drip co-administration of Ultiva, Diprivan, Esmeron, Dormicum, Levophed in titrated doses for the best possible ventilation of the patient. Obesity in combination with COVID-19 leads to increased P peak up to 60 and high airway resistance. Satisfactory dosing of Esmeron 60 mg/h and placement of low tidal volumes <500 ml, as well as respiratory rate <30/min, PEEP <16, appears to improve ventilator ventilation when co-administered: Ultiva, Diprivan, Dormicum at satisfactory levels in combination with Levophed to maintain hemodynamic stability.

Conclusion

Thus it appeared that low respiratory rate <30/min and low tidal volume <500 ml with a desired PEEP less than or equal to 14, has a beneficial effect on obese patients.

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