



Pulmonary Physiotherapy in COVID-19

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Abstract

Currently, the Coronavirus (COVID-19) is a pandemic that is causing death and fear in the world population. This disease is associated with different pulmonary complications such as respiratory failure, acute respiratory distress syndrome and pneumonia. In this short communication about COVID-19 from the point of view of pulmonary physiotherapy and what its current role is in this pandemic. The most up-to-date evidence was used and international recommendations for publications in the "short communication" version were followed, that after our review and analysis, we drafted the pulmonary actions and interventions in which the pulmonary physiotherapist must act. As well as, of the techniques that should be omitted in patients with COVID-19 in acute phase.

Short Communication

Today, March 19, 2020 at noon, the 2019 Coronavirus Disease (COVID-19) has reached 160 countries and infected a total of 242.191 people and generated more than 9.800 deaths. China, Italy, Iran, Spain and Germany are the countries with the highest number of cases to date [1]. In December 2019, the 2019 novel coronavirus was discovered and identified in the viral pneumonia cases that occurred in Wuhan, Hubei Province, China; and then was named by the World Health Organization (WHO) on 12 January 2020. In the following month, the COVID-19 quickly spreading inside and outside of Hubei Province and even other countries. What's more, the sharp increase of the case number caused widespread panic among the people [2]. Guan Y et al. [3] in their titled research "Clinical Characteristics of Coronavirus Disease 2019 in China" mention in that the most common symptoms were fever (43.8% on admission and 88.7% during hospitalization) cough (67.8%), fatigue (38.1%), shortness of breath (18.7%) and diarrhea was uncommon (3.8%). And not only these symptoms, other publications also show pulmonary repercussions associated with COVID-19, mainly respiratory failure, Acute Respiratory Distress Syndrome (ARDS) and pneumonia [4,5].

Having said all this, the work of the entire interdisciplinary team that surrounds this type of patient is of utmost importance. However, in this publication we want to highlight the physiotherapeutic role in cardiopulmonary alterations associated with COVID-19 [5]. So, as everyone is aware of the responsibility of the physiotherapist in the management of the airway and the acquisition of good oxygenation, we want to highlight that in case the patient requires supplemental oxygen, it should preferably be the adaptation of a low oxygen flow system. Oxygen therapy is started if $SaO_2 < 92\%$ ambient air with the aim of maintaining $SaO_2 > 90\%$.

We emphasize that under no circumstances should these patients be nebulized, and the option of non-invasive mechanical ventilation should not be taken into account due to the existing evidence, based on data from the SARS epidemic that these methods may increase the risk of airborne spread of the virus and that it is preferable not to insist on non-invasive treatments. If the patient does not respond correctly, endotracheal intubation is the first option. If it is necessary to pre-oxygenate, it will be done with an O_2 reservoir mask instead of with a mask and self-inflatable or manual ventilation bag (Ambu). If possible, ventilation with a mask and a self-inflating or manual bag (Ambu) should be avoided; but, when it must be used, it will be done with a high efficiency antimicrobial filter (camel nose) between the self-inflating bag and the mask, next sealing well to avoid leaks and avoiding hyperventilation of the patient.

A relevant aspect is related to the posture assumed by the patient. Avoid falling posture (sliding on the bed), favoring a correct position in a semi-sitting or sitting position (35° to 40°).

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Whenever possible and in close collaboration with the team, favor the alternation of lateral decubitus and possibly consider the indication of the semi-prone or prone position. However, changes in position can modify the ventilation/perfusion ratio and lead to an improvement in gases but also to a sudden worsening. Therefore, when the patient is intubated, mechanical ventilation should be applied protectively to the lung with low tidal volumes (4 to 6 mL/Kg of weight) and avoid plateau pressures above 30 cm H₂O, in addition, it will be allowed permissive hypercapnia with pH up to 7.15 and CO₂ up to 60, because ventilation with hypercapnia is preferred to ventilation that damages the lung. PEEP values will be 5 cm to 8 cm H₂O but patients with a body mass index >40 the PEEP value will be 10, PaFi>150 will be 8 to 12 and for PaFi<150 it will be 12 cm to 14 cm H₂O prone position as soon as possible and ventilate the patient continuously in this position for at least 12 h to 16 h/day, preferably within 72 h of endotracheal intubation. If effective, repeat up to PaFi ≥ 150 with PEEP ≤ 10 cm H₂O and FiO₂ ≤ 60% for at least 4 h after supination. The pronation procedure should be discontinued in case of worsening oxygenation (20% decrease in PaFi compared to the supine position) or in case of serious complications. Regarding the I:E ratio, adjust it by flow and/or by inspiratory time by programming a 1:1.5 or 1:2 ratio. All these actions are in order to achieve a minimum 88% to 92% arterial oxygen saturation.

Likewise, the patient should be classified according to the Berlin consensus [6] and the interventions with these patients should be limited to a minimum, only performed when they are relevant (especially aspiration of secretions) and not routinely. Thus, during the suction protocol, it should be performed using the closed secretion aspiration system and saline should not be instilled in the artificial airway.

All of the above mentioned about the respiratory compromise caused by COVID-19 is clear and therefore, the physiotherapist should not cause an additional load on the respiratory work that the subject must bear and consequently avoid exposing him to a greater risk of respiratory distress. That is why, based on our clinical and research experience, we suggest that all physiotherapists avoid performing the following techniques in the acute phase: Diaphragmatic reeducation,

breathing with lips parted, added inspirations, lung expansion exercises, positive pressure, use of inspirometer, manual mobilization, stretches of the rib cage, nasal washes, respiratory muscle training and physical training. In order to prevent over fatigue of the respiratory muscles, intracranial hypertension and intrapulmonary hypertension due aforementioned techniques and combined with the position and PEEP values, would generate an increase in preload and after load at the cardiac level, which in their effect would decrease the cardiac output would affecting the circulating blood volume, perfusion and peripheral oxygenation.

In conclusion, the physiotherapist against the COVID-19 must have training and experience in mechanical ventilation to be able to be part of the interdisciplinary team in a complicated acute phase of this disease. However, for phases where the patient is not under with mechanical ventilation, the actions of pulmonary physiotherapy remain the same applied in pathologies such as H1N1, pneumonia, ARI and ARDS.

References

1. Global Cases by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins. 2020.
2. Ying-Hui J, Lin C, Zhen-Shun C, Hong C, Tong D, Yi-Pin F, et al. A rapid advice guideline for the diagnosis and treatment of 2019 novel coronavirus (2019-nCoV) infected pneumonia (standard version). *Military Medical Research*. 2020;7:4.
3. Guan W, Ni Z, Yu Hu, Liang WH, Ou C, He J, et al. Clinical Characteristics of Coronavirus Disease 2019 in China. *NEJM*. 2019.
4. Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *Lancet*. 2020;395(10223):497-506.
5. Chen N, Zhou M, Dong X, Qu J, Gong F, Han Y, et al. Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: A descriptive study. *Lancet*. 2020;395(10223):507-13.
6. ARDS Definition Task Force; Ranieri VM, Rubenfeld GD. Acute respiratory distress syndrome: The Berlin definition. *JAMA*. 2012;307:2526-33.