




The Preeminent Role of Anesthesiologists in a National Disaster of COVID-19: An Interim Report From a Tertiary Teaching Center

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1. Introduction

Coronavirus disease 2019 (COVID-19) was first reported by the World Health Organization (WHO) as an acute respiratory distress syndrome (ARDS) on January 12, 2020, in the city of Wuhan, China. Less than three months from its appearance, WHO declared the disease a pandemic on March 11, 2020 (1).

2. COVID-19 and its Emergence as a Disaster in Iran

In Iran, an official announcement on February 19, 2020, stated that two persons were infected with SARS-CoV-2 in Qom City, located about 200 km from Tehran. In a short span, it affected people from all strata of society within the city and adjoining countries. Then, within days, the disease swept the entire country like a tornado. Gradually, Iranian clinicians became acquainted with the pathophysiological manifestations of the disease similar to physicians elsewhere in the world. Like physicians around the world, clinicians over here encountered a large influx of patients with COVID-19 presenting with acute hypoxemic respiratory failure (2).

Based on our experience with COVID-19 patients, they show severe hypoxemia and a higher alveolar-arterial gradient. However, pulmonary compliance may not show a marked decrease, and despite a reduction in PaO₂, pulmonary resistance would not depict a significant rise. Although chest imaging of the patients is compatible with ARDS, the lung mechanics of those patients who are placed on mechanical ventilation may not tally fully with ARDS (3), and this ushers in a dilemma how to initiate mechanical ventilation in these vulnerable patients with gross

pulmonary changes coupled with worsening hypoxemia. However, there is an overall consensus that these patients should receive supplemental oxygen and supportive care (4).

3. Management Protocol of COVID-19 Patients at Our Center

Our hospital was selected as a referral triage center for COVID-19 patients. By now, 26,000 patients have been triaged out of whom, 2,350 have been admitted with the clinical presentation of COVID-19. To cope with the large influx of patients and the shortage of Intensive Care Unit (ICU) beds, our department decided to launch a comprehensive respiratory and hemodynamic care of COVID-19 patients who are admitted to the infectious, internal medicine, and surgical wards after they were triaged by the faculty of the emergency department. This strategy was specifically intended to embrace all these patients in close surveillance and under an umbrella of respiratory and hemodynamic care in their respective wards, as well as the direct supervision and vigil of the attending anesthesiologists. This master plan was implemented for the explicit purpose of affording care for such patients admitted to these wards because of an overwhelming load of patients, suffice it to say that all the sophisticated monitors are employed for these cases to tackle any eventuality of impending hypoxemia or any other arrhythmias induced by antiviral regimens or secondary to hypoxemia. As a commonly used measure in perioperative and intensive care settings, intensive monitoring is more likely than intermittent monitoring to lead to the early identification

of patients who are developing complications (5). However, patients not responding to conventional treatment protocols identified by a descending slope curve of oxygen saturation would be intubated by the attending anesthesiologist, and they would be placed on mechanical ventilation until the availability of an ICU bed. Those patients who show improvement in clinical examinations and monitoring parameters would be declared as non-emergent and discharged from the wards if the attending physician agreed upon. During their initial stay in the wards, educational sessions are always conducted with the faculty of other specialties and the nursing staff for purposes such as transferring the knowledge of oxygen therapy and its correct utilization for patients who need it, thus avoiding oxygen wastage in these critical moments.

During their visits, the attending anesthesiologists would critically assess the hemodynamic and respiratory parameters and, accordingly, would treat patients with hypoxemia and negligible hypercapnia in the wards with supplemental oxygen and physiotherapy as required. Supplemental oxygen would be delivered to these patients via nasal cannula, simple face mask, reservoir mask, and continuous positive airway pressure (CPAP) when the pulse oximetry shows a decline in oxygen saturation. In more severe cases, non-invasive ventilation (NIV) would be employed. In retractable cases, high flow nasal cannula (HFNC) and CPAP would be expected. Non-invasive positive pressure ventilation (NIPPV) is used as a bridge while other medical treatments begin to exert their effects, and such a regimen drastically curtails the rate of endotracheal intubation in the patients. Residents and nurses accompanying the faculty member would monitor the respiratory parameters and Glasgow coma scale score of the patients if there is any deterioration in arousal or wakefulness.

Besides, the anesthesiologist would look at any ventilation-perfusion (V/Q) mismatch. Depending on chest imaging (CT scans) and plain X-ray findings, patients are positioned on the bed in a way that the affected regions of the lungs would lie uppermost and the non-affected lungs lie lowermost, thus facilitating enough perfusion to these parts of the lungs to rectify any V/Q mismatch and alleviate the ongoing hypoxemia. We employ this protocol for all COVID-19 patients at our center and fetch the following fruitful results.

4. Fruitful Dividends of Our Management Strategy

1) Early and timely support of respiration results in marked improvement of patients, and quite a large number of them were discharged from the ward in good condition but instructed to stay home, avoid any outing, and return if the symptoms re-appeared.

2) As patients are being taken care of in the wards and intermediate holding areas under close surveillance, there is a considerable reduction in ICU admissions, leaving the beds for critically ill patients.

3) This protocol helps other physicians in their respective wards and greatly decreases their workload.

4) Because of the correct utilization of supplemental oxygen, the oxygen tanks are always full in the stores.

5) The presence of an anesthesiologist along with PG3 and PG4 residents helps in monitoring the respiratory and hemodynamic status of the patients. It also helps the residents to take care of such patients, thus helping us in achieving the lofty goals of residency training.

6) Evaluation and timely intervention are possible for any cardiac arrhythmias secondary to hypoxemia or else due to drugs employed for the patients.

7) It is facilitated to care for patients after discharge from the ICU, thus reducing the chances of re-admission.

8) A mechanized triage and allocation of patients to ICU are strictly made on a priority basis, taking ethical considerations into view.

Footnotes

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