

# COVID19: Intensive Care Perspective

Arzu TOPELI\*<sup>1</sup>

\*Member of COVID19 Scientific Advisory Board of Turkish Ministry of Health

<sup>1</sup>Hacettepe University, Faculty of Medicine, Department of Internal Medicine, Division of Intensive Care Medicine, Ankara, Turkey

Since the beginning of 2020, we are faced with COVID19 pandemic caused by SARS-CoV 2 virus. So far, more than 1.7 million people are affected worldwide and more than 100,000 people lost their lives. The first case was seen in March 10, 2020 in Turkey and Turkish Ministry of Health established a broad Scientific Advisory Board composed of scientists and physicians from different specialties. The Board together with the Ministry of Health have established guidelines in management and have taken actions against its spread in the community. According to the report of the Ministry of Health, more than 60,000 people have been infected in Turkey and 1300 people have died due to it till today (April 13, 2020).

World Health Organisation declared it as a pandemic on March 11, 2020, which is a viral pneumonia pandemic, not a simple flu, with a transmission rate (Ro) of 2-4 and almost 50% of the population is expected to be infected. Of COVID19 patients about 40% have mild disease similar to upper respiratory tract infection, about 40% have moderate pneumonia without any need for O<sub>2</sub> supplement, about 15% have severe pneumonia with dyspnea, tachypnea and/or hypoxemia (SO<sub>2</sub> < 0.93 under room air or PaO<sub>2</sub>/FiO<sub>2</sub> < 300) and about 5% are critically-ill with respiratory failure, ARDS, sepsis and septic shock, multiple organ failure. Intensivists are faced with up to 5-20% of these patients including severe pneumonia patients depending on the surge and the capacity. Normally, intensive care capacity and organization, not only the bed and ventilator number but also the quantity and quality of intensive care staffing are of utmost importance. However, in a pandemic intensive care demand might surpass the surge capacity, so everywhere of the hospital might become an ICU, and every personnel might work in the ICU. Unfortunately,

this brings a high risk of suboptimal care not only for COVID19 but also for non-COVID19 patients. Even well developed countries in intensive care medicine like Italy, Spain, USA and UK unfortunately faced with this high demand which surpassed their capacity.

COVID19 is a disease transmitted via droplets and contact, so patients should be put in isolated rooms and if possible in rooms with negative-pressure since many intensive care procedures (intubation, extubation, non-invasive ventilation, high flow O<sub>2</sub> therapy, endotracheal suction, bag-mask ventilation, nebulization, bronchoscopy, tracheotomy, etc) are highly aerosol generating procedures and health care staff performing these procedures should wear appropriate personal protective equipment. Intubation with video-laryngoscopy and a closed ventilator tubing including closed suction catheters should be preferred. These facts emphasize that intensive care units should be designed as single room ICUs, with sufficient numbers of negative pressure isolated rooms.

The disease starts like a simple flu-like illness, the course is unpredictable and clinical deterioration and progression is usually seen after 7 days. PCR based diagnostic tests have moderate sensitivity therefore repeated tests should be done and thorax CT is very valuable in diagnosis with typical findings basically the bilateral and peripherally located ground glass opacities. So far, older age (>60); male sex; having comorbidities such as hypertension, cardiovascular disease, diabetes, immunosuppression; lymphopenia; increased neutrophil to lymphocyte ratio; cytopenias; increased levels of ferritin, CRP or high sensitivity CRP, D-dimer, LDH have been reported to be associated with poor prognosis. It

is also important to recognize the deterioration in the ward and transfer the patient to the ICU as early as possible.

Hypoxemic patients ( $\text{PaO}_2/\text{FiO}_2 < 200$ ) or patients with significant CT findings should be prone even if they are not intubated. This might prevent progression and even intubation, though this suggestion is based on observations not on trials. In fact, suggestions in terms of treatment and management of COVID19 patients are not based on trials and moreover, studies published so far are criticized a lot for being published too quickly without sufficient peer-reviewing and most of them are underpowered with poor quality and even with no control groups. Therefore, management and treatment guidelines of COVID19 patients are based on expert opinions and observations. So, for the time being, there is no definite treatment of COVID19 and each treatment should be evaluated within the context of clinical trials. Hydroxychloroquine, an old anti-malarial and rheumatologic drug which inhibits viral entry into the cell have been proposed even together with azithromycin but they cause serious cardiac side effects especially due to QT prolongation and their use cannot be justified due to some recent randomized controlled studies with negative results. Antivirals against RNA viruses such as remdesivir and favipiravir might have limited benefit as they have been shown to decrease viral shedding and symptoms, but the studies are not well-powered. Convalescent plasma obtained from donors who recovered from COVID19, in other words passive immunization, which is a very old technique used in infections, might be promising but we need to have some more results of studies.

There are some interesting properties of COVID19 patients. The first one is the observation of relatively preserved compliance in the majority of the ARDS patients. This might suggest hypoxemia being due to hypoxic vasoconstriction and ventilation perfusion mismatch, and therefore recruitment and high PEEP applications might not be helpful and could even be detrimental. As well, the patients have thick secretions and mucous plugs which are of great

concern. The second one is the prominence of myocarditis seen in about 20-30% of cases. The third one is the hypercoagulopathy or increased risk of thrombosis necessitating anticoagulant or antiaggregant treatment. And the last one is the hyperferritinemia or serious increases in acute phase reactants suggesting a cytokine storm state or a secondary hemophagocytic lymphohistiocytosis resembling macrophage activation storm seen in rheumatologic diseases. Therefore, treatment with anti-interleukin 1 receptor or anti-interleukin 6 has been proposed, but for the time being we have to be sceptical in such treatments because anti-tumor necrosis factor and other similar treatments were not found to be beneficial in sepsis and ARDS in prior trials. And in fact, sepsis is accepted as a state of immunosuppression and these immunosuppressive drugs might worsen the situation by depressing natural immunity against the virus and increase the risk of secondary infections. Therefore, currently, routine use of these drugs cannot be recommended.

More than 3 months have passed, but there are still too many unknowns. We as the intensivists, including our infectious diseases specialists and emergency medicine physician colleagues and partners such as nurses, physiotherapists, etc. are and will be working front line in this battle. Some of us have already been sick and perhaps been in critical condition. However, we will definitely win the war. Intensive care medicine developed with a pandemic in 1950s which was polio at that time and many of us remember the photographs of medical students ventilating patients continuously. So, this is neither the first, nor will be the last pandemic, which is pointing out to the world - from ordinary citizens to all healthcare professionals and policy makers - that intensive care medicine is important and should be valued not only during pandemics but also in routine life.

In this first issue of 2020, we are publishing a supplement consisting of reviews on different aspects of COVID-19. We hope they will be helpful and we look forward to more studies which will help us to understand the disease pathophysiology and process, and will help to treat our patients for successful patient outcomes.