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Commentary

Clinical Use of Extracorporeal Membrane Oxygenation for Rescue Therapy in Covid-19 Era

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Extracorporeal membrane oxygenation (ECMO) is a kind of extracorporeal life support for prolonged hemodynamic and respiratory Assist to persons whose cardio vascular and respiratory system are unable to support basic metabolic needs of the body [1]. The use of ECMO in medical critical situation has steadily increased over the past decade. Significant improvements in the technology associated with ECMO have propagated this recent resurgence and contributed to improved patient outcomes [2]. In routine practice, ECMO applied in patients with cardiac and/or respiratory failure. It is adopted to partially or completely replace the cardiopulmonary operation; so the main Indications of using ECMO are according to cardiac or pulmonary function. ECMO works as a bridge in which organ failure could be compensated or its function corrected by support over the time, or replace by an adequate grafted organ. ECMO is used either post-cardiopulmonary bypass or in late stage treatment of a person with profound heart, lung or both of them failure [1-3].

The majority of patients with COVID-19 infection had mild symptoms and can be cured conservatively. However, some can progress to the severe form which has developed respiratory failure. Mechanical ventilation is the main supportive treatment for the respiratory failure due to SARS-CoV-2 but; extracorporeal membrane oxygenation potentially could do the job of the lungs and let it rest and recover. This strategy must be used when all other forms of lung support including artificial ventilation have failed in the critically ill patients [3-5].

In our practice, we are seeing use of ECMO as a treatment for cardiac arrest or after cardiopulmonary bypass surgeries allowing for treatment of the underlying cause of cardiac dysfunction or reversible causes of lung failure while circulation and oxygenation are supported. Recently, we have considered the use of ECMO in critically ill patients with severe lung involvement caused by Covid 19; although, our concept is not new and it is used in some other centers [1, 2, 4-6]; we used the ECMO according to a liberal strategy and the common point of our decision making for applying ECMO in these situations was potentially reversible underlying causes and unresponsive to conventional management.

In our setting, when we encounter a sustained persistent pulse less ventricular tachycardia or sudden cardiac arrest due to cardiovascular events; after 15 minutes of cerebro-cardiopulmonary resuscitation if we found the patient viable from neurological point of view then we apply for ECMO support. In these cases femoral venous and artery Cannulaes were prepared by the Seldinger technique or

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via surgical cut down. The largest cannulae that can be placed in the vessels are used in order to V-A cardiopulmonary ECMO support [2-4]. Simultaneously by resuscitation and found the patient cannulation, ECMO machinery will be setup and ready to use. Following appropriate preparation, the estimated amount of blood flow through the ECMO circuit is determined using hemodynamic, cerebral oxymetery and mixed venous O2 content parameters. Once the initial targets parameters have been achieved, the blood flow is maintained at that rate. Frequent assessment and adjustments are facilitated by continuous venous oximetry, which directly measures the oxyhemoglobin saturation of the blood in the venous limb of the ECMO circuit.

Patients whom suffer from SARS-CoV-2 disease are due to inflammation of the vessles (endothelitis) and cytokines storms are in a hyper-coagulopathy state, sharp drop of pulmonary compliance and prone to cardiovascular events and respiratory failure [4]. In these patients, when we encounter with a sustained tissue hypoxia in spite of full ventilator support plus refractory arrhythmia, cardiac arrest or fragile hemodynamic status in spite of appropriate pharmacological support, we keep cannula in femoral artery and venous and continue our hemodynamic and respiratory support by ECMO for about 96 hours and keeping the respiratory system in minimal functional status with lung protection strategy [3-4]. During this resting time for pulmonary and cardiac system while end organs keep viable by adequate perfusion supporting by ECMO; we find enough time adjusting immune suppressive agents including pulse of steroids plus monoclonal antibodies, biological therapy and prescription regulate immune system drugs and reconsider appropriate dose of inotropic drugs. Despite all these measures though, the outcome seen in our patients was very different. Some patients recovered (60%), while others did not. We concluded; ECMO remains an option for the treatment of patients with refractory hypoxemia despite advanced cardiopulmonary support. It is very sophisticated intensive procedure and dependent to the operator skills and experience, but could be a life-saving treatment [4-6].

This method of treatment could not be suggested as a solution, but since this strategy is the only way left to prevent on witness patient death so, it is still noticeable as a rescue therapy [1-2,6].

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