From the Editor's Desk: Learning Case by Case by Case(s)

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Change is the end result of all true learning

—Leo Buscaglia

Starting in February 2020 we saw an exponential rise in the number of peer review publications related to the pandemic caused by the coronavirus disease 2019 (COVID-19) virus. It quickly became clear that this was a very contagious viral illness with significant morbidity and mortality that could consume all available medical resources. Despite all efforts of using standard respiratory support treatments, many patients would not recover enough pulmonary function and succumb to respiratory failure. In addition, it was also observed that 20–30% of these patients had cardiac involvement and would die from a cardiac cause. In an effort to save lives, selected patients were placed on extracorporeal membrane oxygenation (ECMO) using current criteria for initiating ECMO support.¹ Slowly, case reports and small series have been published describing these early experiences from Europe and China.² Although there was some success and lives saved, the overall mortality was high for these people. Thus, to determine which patients might benefit most, when to initiate ECMO support, what are useful adjuvant therapies and what is “best practice” it has been evolving on a case-by-case basis. In this issue, we have several additional ECMO cases as well as a collection of small ECMO case series from which we hope that we can begin to refine our decision making and treatment choices. Hartman and colleagues³ report one of the first successful cases in the United States. Their case describes a typical patient with rapid pulmonary deterioration, cytokine storm, and renal involvement who was able to be stabilized with venovenous ECMO (VV-ECMO) and after 160 hours of support was weaned from ECMO and ultimately discharged home. They postulate that the VV-ECMO allowed time for the patient to benefit from the additional therapies of hydroxychloroquine, IL-6 receptor blockade, and high-dose Vitamin C. Bemtgen and colleagues⁴ report a patient with severe acute respiratory distress syndrome (ARDS) from COVID-19 complicated by cardiogenic shock. Their patient was supported with venoarterial ECMO (VA-ECMO) and an Impella CP Smart Assist. The patient has been able to be weaned from the Impella support and concerted to VV-ECMO. This case demonstrates the possible role of left ventricular hemodynamic catheter-based support in addition to ECMO for selected patients who have cardiovascular collapse as well. LoForte and colleagues⁵ describe an asymptomatic left ventricular assist device (LVAD) patient where a positron emission tomography (PET) scan looking for infection was able

to assist in an early diagnosis of COVID-19 leading to early isolation. From each of these cases, we are slowly expanding our knowledge base and sharing experiences. Jacobs and colleagues⁶ have also added to this growing experience by recording and reporting on 32 patients supported with ECMO from nine different programs in the United States. This cumulative experience still demonstrates a high mortality, and many of the patients requiring ECMO support have significant preexisting comorbidities including obesity, diabetes, and heart disease. Although not supported by previous recommendations, 80% of their survivors received steroids and some received additional adjuvant therapy including antiviral medication and IL-6 monoclonal antibody. With this growing body of experience, Dr. Slepian and the ASAIO have created a “living document” describing the current situation and treatment options for patients with COVID-19.⁷

As with any new treatment or device, we are still in the “observe and record” phase regarding the most proper and efficient use of ECMO for supporting patients with severe ARDS as a result of COVID-19. We are now emerging from the case report phase to limited series. ELSO continues to accumulate worldwide experience from their voluntary database. With emerging larger data sets, hopefully soon we will be better at deciding who should be placed on ECMO, when should it be initiated, and what adjuvant therapies have a consistent and reproducible effect that will improve outcomes.

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