LETTER TO THE EDITOR

Letter to the Editor Regarding Recent Current Cardiology Review “Cardiac Arrest in the Cardiac Catheterization Laboratory” by Yadav and Truong

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Dear Editor,

We read with interest Yadav and Truong’s recent excellent review regarding cardiac arrest occurring in the cardiac catheterization laboratory (cath lab) [1]. The authors suggest a valuable role for percutaneous mechanical circulatory support devices (pMCS) in the treatment of selected cardiac arrest patients who do not respond to mechanical chest compression, pharmacotherapy and repeat defibrillations. In their protocol, the authors propose Extracorporeal Membrane Oxygenation (ECMO) as the preferred pMCS. However, this recommendation, based in part, we suspect, on the authors’ vast and successful experience with ECMO, may not be widely applicable.

In our cath lab, the preferred pMCS in patients with refractory ventricular fibrillation/ventricular tachycardia is the Impella device rather than ECMO. Particularly attractive features of the Impella include instant availability as well as ease and speed of implantation. ECMO requires a perfusionist both to assemble the circuit (a task that takes about 15 minutes) and to manage the device in the cath lab [2]. At our center, a perfusionist is not always immediately available. In contrast, there is always an Impella device present in our cath lab. Moreover, with increasing experience (our center implants > 150 Impella devices each year), we are generally able to implant and initiate the device within 10 minutes. Management of the Impella device is directed by the physician with support from trained cath lab staff, and so does not require a perfusionist.

Our experience has been that the Impella device, when compared to ECMO, is associated with a lower rate of major vascular complications. This is likely, at least, in part due to the larger bore access sites needed for ECMO. The latter system requires a 15 F to 22F femoral arterial sheath, whereas the Impella 2.5 requires only a 13 F sheath and the Impella CP model a 14 F sheath [3]. Our impression of high vascular complication rates with ECMO is supported by the observations made in prospective, observational study (the Cheer trial) regarding the role of ECMO in the treatment of patients with refractory cardiac arrest [4]. Vascular surgery intervention was required in 10 of the 24 (42%) patients who underwent cannulation. This included femoral artery repair and placement of an arterial backflow cannula in 9 patients and fasciotomy of an ischemic limb in 1 patient. In comparison, a much lower major vascular complication rate (1.5%) has been reported with the Impella device [5].

Perhaps the most compelling reason to favor Impella over ECMO in cardiac arrest is the superior hemodynamic benefits provided by Impella. ECMO increases the afterload and preload on the left ventricle, thus increasing myocardial oxygen demand and potentially impeding myocardial recovery [2, 3]. In sharp contrast, the Impella device provides almost immediate and sustained unloading of the left ventricle while increasing overall systemic cardiac output with maintenance of mean arterial pressures [2, 3, 6].

Over the last number of years, there has, in the United States (U.S.), been rapid adoption of the Impella device. Currently, implantation of this device is performed in > 1,000 US medical centers [7]. This increased availability will likely result in Impella being used more frequently as the preferred pMCS in the treatment of cardiac arrest patients in the cath lab.

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