

Authors have nothing to disclose with regard to commercial support.

specific territories can provide segmental wall motion improvements is very valid. Myocardial viability studies would have been useful, pairing them with the revascularization strategy in hopes that a grafted viable territory, especially in a vulnerable and viable segment such as the inferior wall, could stabilize LV dimensions and the associated tethering. These exams were not part of the trial protocol, which was aimed primarily not at finding factors associated with MR recurrence following surgery, but at comparing 2 treatment strategies: MV ring annuloplasty and MV replacement with full chordae preservation. Similarly, we do not have postoperative angiograms to assess the permeability of the graft in a given territory to be able to examine its association with MR recurrence. This limitation was acknowledged in our articles.

We agree with Wang and Tang regarding the need to better predict postrepair MR recurrence to tailor the choice of surgical approach to the likelihood of recurrent IMR. The model obtained from our data based on 10 variables (ie, age, body mass index, sex, race, effective regurgitant orifice area, BAD, New York Heart Association functional class, prior percutaneous or surgical revascularization, and history of ventricular arrhythmia) is accurate in its determination of optimal candidates for MV surgical repair.

*Denis Bouchard, MD<sup>a</sup>*

*Louis P. Perrault, MD<sup>a</sup>*

*Irving L. Kron, MD<sup>b</sup>*

*Judy W. Hung, MD<sup>c</sup>*

*<sup>a</sup>Montréal Heart Institute*

*University of Montréal*

*Montréal, Québec, Canada*

*<sup>b</sup>Division of Thoracic and Cardiovascular Surgery*

*University of Virginia School of Medicine*

*Charlottesville, Va*

*<sup>c</sup>Division of Cardiology*

*Massachusetts General Hospital*

*Boston, Mass*

## References

1. Kron IL, Hung J, Overbey JR, Bouchard D, Gelijs AC, Moskowitz AJ, et al. Predicting recurrent mitral regurgitation after mitral valve repair for severe ischemic mitral regurgitation. *J Thorac Cardiovasc Surg*. 2015;149:752-61.
2. Levine RA, Hagège AA, Judge DP, Padala M, Dal-Bianco JP, Aikawa E, et al. Mitral valve disease—morphology and mechanisms. *Nat Rev Cardiol*. 2015;12:689-710.

<http://dx.doi.org/10.1016/j.jtcvs.2016.09.054>



**CARDIAC SURGERY  
CENTERS ARE IDEAL  
PLACES TO TREAT  
PATIENTS UNDERGOING  
LIFE-THREATENING  
DEEP ACCIDENTAL  
HYPOTHERMIA USING**



**EXTRACORPOREAL MEMBRANE  
OXYGENATION VENOARTERIAL  
THERAPY**

### To the Editor:

It was with great interest that we read the publication by Squiers and colleagues<sup>1</sup> in the July issue of the *Journal*. The authors presented an excellent review of the latest trends of extracorporeal membrane oxygenation (ECMO) therapy in adult patients. We would like to suggest the need of completing the review with an additional description of how the ECMO venoarterial (VA) therapy for patients with accidental deep hypothermia in life-threatening status was implemented.

The guidelines of the European Council of Resuscitation recommend that patients with a core body temperature less than 28°C and with hemodynamic instability (systolic arterial pressure <90 mm Hg, ventricular arrhythmia) or undergoing cardiac arrest be immediately transferred to a center experienced in extracorporeal life support therapy to implement extracorporeal perfusion and ventilation therapy preferably with an ECMO VA system.<sup>2</sup>

For the past 3 years, in our center, we have been using a unique system of qualifying patients with accidental deep hypothermia for ECMO VA therapy.<sup>3</sup> The implementation of this procedure would have not been possible without the active support of all personnel from the cardiac surgery and intensive therapy departments, as well as the mentoring supervision of our ECMO coordinator (head of our Severe Accidental Hypothermia Center).

Establishing a role of coordinator available 24 hours a day via telephone was crucial for the system's success. The tasks of the coordinator include consultation of hypothermia cases diagnosed on the territory of the voivodeship, competent aid during diagnostics and treatment in medical centers, and potential qualification for extracorporeal rewarming.

During the implementation of this system, it was necessary to inform and train everyone involved in this "survival chain" about the principles of ECMO therapy and the need of implementing more advanced therapy procedures, as well as to take steps to determine the immediate qualifying inclusion criteria for patients.

Authors have nothing to disclose with regard to commercial support.

Since July 2013, there have been 198 hypothermic patients who consulted with the Hypothermia Coordinators. A total of 167 patients with cardiac stability underwent noninvasive rewarming in the referral hospital.

A total of 31 patients were admitted to our center in deep hypothermia and were treated with ECMO VA therapy. Seventeen of the patients were admitted in a state of cardiac arrest (time between admission and starting ECMO therapy was 107-345 minutes). In this group, 9 patients died and 8 patients (47.06%) registered 15 points on the Glasgow Coma Scale and 1 point on the Cerebral Protection Category. The other 14 patients were admitted in cardiogenic shock. Of these, 5 patients died, and 9 patients (64.29%) survived and registered 15 points on the Glasgow Coma Scale and 1 point on the Cerebral Protection Category (64.29%).

The results of treatment of all patients treated are collected and submitted to the international Web site registry at <https://www.hypothermia-registry.org/>.<sup>4</sup> Cardiac surgery centers, with highly trained personnel experienced in extracorporeal life support, are ideal places to establish a local center to treat severe accidental hypothermia.

Tomasz Darocha, MD, PhD<sup>a</sup>  
Jarosław Stoliński, MD, PhD<sup>b</sup>  
Jacek Piątek, MD, PhD<sup>b</sup>

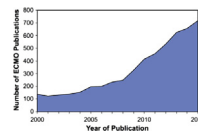
<sup>a</sup>Department of Anesthesiology and Intensive Care  
Severe Accidental Hypothermia Center  
John Paul II Hospital, Medical College of Jagiellonian  
University

<sup>b</sup>Department of Cardiovascular Surgery and  
Transplantology  
Collegium Medicum, Jagiellonian University  
John Paul II Hospital  
Cracow, Poland

## References

1. Squiers JJ, Lima B, DiMaio JM. Contemporary extracorporeal membrane oxygenation therapy in adults: fundamental principles and systematic review of the evidence. *J Thorac Cardiovasc Surg*. 2016;152:20-32.
2. Truhlár A, Deakin CD, Soar J, Khalifa GE, Alfonzo A, Bierens JJ, et al. European Resuscitation Council Guidelines for Resuscitation 2015: Section 4. Cardiac arrest in special circumstances. *Resuscitation*. 2015;95:148-201.
3. T1 Darocha, Kosiński S, Jarosz A, Gałzowski R, Sadowski J, Drwiła R. Severe accidental hypothermia center. *Eur J Emerg Med*. 2015;22:288-91.
4. International Hypothermia Registry. Available at: <https://www.hypothermia-registry.org/>. Accessed August 24, 2016.

<http://dx.doi.org/10.1016/j.jtcvs.2016.08.047>



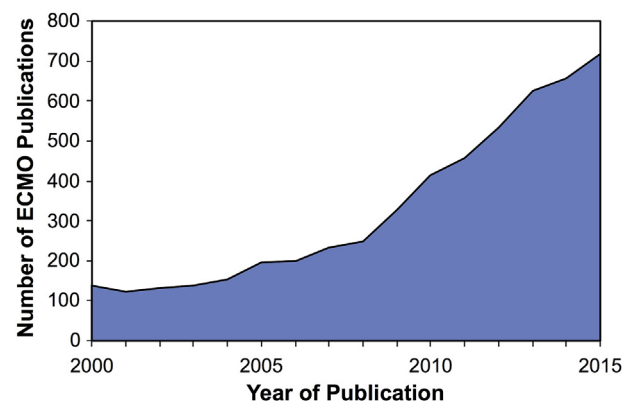
## A CALL FOR STANDARDIZED END POINT DEFINITIONS REGARDING OUTCOMES OF EXTRACORPOREAL MEMBRANE OXYGENATION



### Reply to the Editor:

We read with great interest the letter from Darocha and colleagues<sup>1</sup> regarding our recent review<sup>2</sup> of extracorporeal membrane oxygenation (ECMO). It is clear that Darocha and colleagues<sup>1</sup> deserve congratulations for their pioneering work toward implementing venoarterial ECMO to resuscitate patients with accidental deep hypothermia complicated by hemodynamic instability or cardiac arrest. Less clear, however, is whether the presented data truly “completes” a comprehensive review of contemporary ECMO, as they contend in their letter.

The expansion of ECMO during the last decade continues at a furious pace, as evidenced by the trend in annual ECMO-related publications during this time (Figure 1). ECMO innovation is occurring so rapidly that it has become nearly impossible for the interested reader to keep up with the latest literature on the topic. For example, during the 3 months that passed between the publication of our initial article and the submission of this letter, the *Journal of Thoracic and Cardiovascular Surgery* alone published or accepted for publication at least 4 additional original or review articles about ECMO.<sup>3-6</sup> Other major journals in the fields of cardiovascular medicine and critical care have also published original research on ECMO, ranging from initial experiences with novel indications such as post-pulmonary endarterectomy<sup>7</sup> and cardiopulmonary failure



**FIGURE 1.** Number of PubMed-indexed publications with any of the terms “extracorporeal membrane oxygenation,” “ECMO,” “extracorporeal life support,” or “ECLS” included in the title, abstract, or both from 2000 to 2015. *ECMO*, Extracorporeal membrane oxygenation.