develop a mobile ECMO treatment protocol to be used during transport to the extracorporeal life support center. In our experience, it is a safe and effective method. It is easier and safer to transport a device (with staff) to a remote hospital than to transport a patient requiring continuous chest compressions for 100 or 200 km. Implementation of extracorporeal therapy at the hospital nearest the incident site or even at the site of the incident presents an interesting new mode of treatment. Since November 2013, we have achieved 58% survival among 31 hypothermic patients (cardiac arrest or cardiogenic shock in severe hypothermia). In the cardiac arrest subgroup consisting of 17 patients (duration until implementation of extracorporeal rewarming: 107 to 345 minutes), survival is 47%. All patients were discharged from the hospital with Glasgow Coma Scale 15 and Cerebral Performance Category 1.

*Tomasz Darocha, MD, PhD
Sylweriusz Kosinski, MD, PhD
Pawel Podsiadlo, MD
Anna Jarosz, MD
Rafal Drwila, Prof

*Severe Accidental Hypothermia Center
Department of Anesthesiology and Intensive Care
John Paul II Hospital
Medical College of Jagiellonian University
Pradnicka 80
Cracow, Malopolska 31-207
Poland
E-mail: tomekdarocha@wp.pl

http://dx.doi.org/10.1016/j.jchf.2016.07.008

Please note: The authors have reported that they have no relationships relevant to the contents of this paper to disclose.

REFERENCES

1. Aubin H, Petrov G, Dalyanoglu H, et al. A suprainstitutional network for remote extracorporeal life support: a retrospective cohort study. J Am Coll Cardiol HF 2016;4:698–708.

2. Brown DJ, Brugger H, Boyd J, et al. Accidental hypothermia. N Engl J Med 2012;367:1930–8.

3. Truhlář A, Deakin CD, Soar J, et al. European Resuscitation Council guidelines for resuscitation 2015: section 4. Cardiac arrest in special circumstances. Resuscitation 2015;95:148–201.

4. Darocha T, Kosiński S, Jarosz A, et al. Severe accidental hypothermia center. Eur J Emerg Med 2015;22:288–91.

REPLY: EMS, HEMS, ECMO Center, ICU Team: Are You Ready for Hypothermic Patients?

Extracorporeal Membrane Oxygenation in Severe Accidental Hypothermia

We thank Dr. Darocha and colleagues for the comment on our paper (1) in which we reported the implementation of a suprainstitutional network for rapid response remote extracorporeal life support (ECLS) for refractory circulatory failure. With great enthusiasm, we read about their efforts to implement an ECLS network for patients with unstable hemodynamics or cardiac arrest due to accidental severe hypothermia in southern Poland (2) and congratulate them on the reported early results, with very encouraging survival and outcome rates.

It is our conviction that a close suprainstitutional collaboration between specialized centers and primary care institutions may help to improve survival and outcome of hemodynamically highly compromised patients in emergency situations by providing on-site ECLS support and subsequent customized and interdisciplinary therapy. However, due to the immense resource burden and the derived socioeconomic implications, adequate patient selection criteria based on survival-based predictors seem indispensable. Therefore, and as also emphasized by Darocha et al. (2), education of emergency department and intensive care unit staff of participating institutions, who are the ones in first contact with the patient in need and are responsible for the decision to treat, as well as efficient logistic coordination, are mandatory for the success of such programs.

In *ultima ratio* emergency situations, the outcome of mobile ECLS support is usually conditioned by the time-to-initiation of circulatory support because prolonged hypoperfusion may lead to irreversible end-organ damage, limiting survival (3). Hence, caution is advised when operating in a setting that may constitute a logistical challenge, either due to an oversized catchment area or to a difficult access region, such as the one described by Darocha et al. (2). Nonetheless, severely hypothermic patients represent a special patient cohort (4), as hypothermia increases tolerance to prolonged hypoxemia, expanding the time frame and operational distance in which mobile advanced mechanical circulatory support may still be beneficial for the patient at risk. Furthermore, hypothermic cardiac shock may require additional left ventricular and/or pulmonary artery venting due to pulmonary congestion or concomitant hypoxic acute respiratory distress syndrome (5), demanding special expertise beyond percutaneous transfemoral cannulation, which usually is only available in specialized centers. Therefore, in the setting described by Darocha et al. (2), a specialized center-based ECLS network may be of particular benefit for patients experiencing accidental severe hypothermia despite challenging logistics.

In this regard, now that mobile ECLS is becoming an increasingly applied treatment option for patients

presenting with therapy-refractory circulatory failure in emergency situations, joint efforts are warranted to analyze the results of mobile ECLS emergency support in a variety of different settings in order to improve existing facilities and guide the implementation of future mobile ECLS programs.

Hug Aubin, MD
***Artur Lichtenberg, MD**
Alexander Albert, MD

*Department of Cardiovascular Surgery
Heinrich-Heine-University Düsseldorf
Moorenstrasse 5
40225 Düsseldorf, Germany
E-mail: artur.lichtenberg@med.uni-duesseldorf.de

http://dx.doi.org/10.1016/j.jchf.2016.07.010

Please note: The authors have reported that they have no relationships relevant to the contents of this paper to disclose.

REFERENCES

1. Aubin H, Petrov G, Dalyanoglu H, et al. A suprainstitutional network for remote extracorporeal life support: a retrospective cohort study. J Am Coll Cardiol HF 2016;4:698–708.

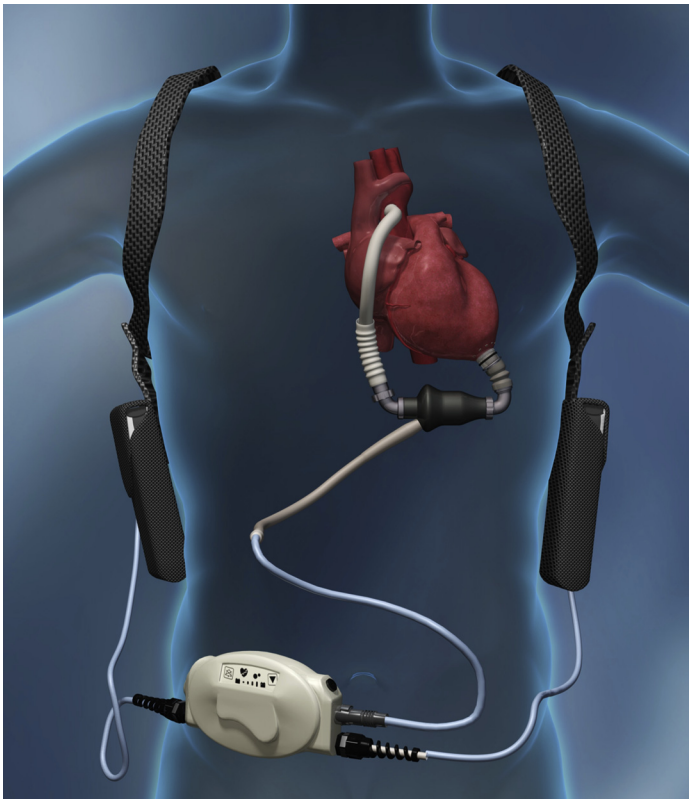
2. Darocha T, Kosinski S, Jarosz A, Galazkowski R, Sadowski J, Drwila R. Severe accidental hypothermia center. Eur J Emerg Med 2015;22:288–91.

3. Leick J, Liebetrau C, Szardien S, Fischer-Rasokat U, Willmer M, van Linden A, Möllmann H. Door-to-implantation time of extracorporeal life support systems predicts mortality in patients with out-of-hospital cardiac arrest. Clin Res Cardiol 2013;102:661–9.

4. Truhlář A, Deakin CD, Soar J, et al. European resuscitation council guidelines for resuscitation 2015: section 4. Cardiac Arrest In Special Circumstances. Resuscitation 2015;95:148–201.

5. Sellmann T, Saeed D, Danzeisen O, Albert A, Blehm A, Kram R, Winterhalter M. Extracorporeal membrane oxygenation implantation via median sternotomy for fulminant pulmonary edema after cold water submersion with cardiac arrest. J Cardiothorac Vasc Anesth 2012;26:887–9.

FIGURE 1 HeartMate II Continuous Flow LVAD



The LVAD is connected to the electronic controller and the battery packs by a percutaneous lead. The electronic controller is worn on a belt, while the battery packs are worn on a shoulder holster. Reprinted with permission from Rogers et al. (6) LVAD = left ventricular assist device.

Redesigning Ventricular Assist Devices to Protect Ethnic Minorities

Changing Design With Changing Times

Approximately 5.7 million adults in the United States are living with heart failure (1). For patients with advanced heart failure who are too ill to wait for a donor or who are not eligible for a heart transplant because of age or other medical problems, ventricular assist devices (VADs) offer life-saving therapy (2,3). VADs were initially designed as a temporary support to bridge patients to heart transplantation, but in recent times, these devices are increasingly being used as lifetime support or destination therapy (4). With continual improvements in device design along with advances in medical and surgical management, VAD patients can now return home, to work, and to their communities with fairly good quality of life. The durable VADs have battery pockets and a control unit (**Figure 1**), which needs to be carried around by the patient at all times. Recently, during an encounter with a VAD patient of African American ethnicity, the patient expressed some unique concerns.

When asked "Mr. X how are you doing today?" he replied "I'm doing well, but there is something I need to tell you—recently while I was at a restaurant, people were staring at me from their tables, which has never happened before. My friend pointed out that my VAD equipment looked like a shoulder holster."

Mr. X went on to say, "In the light of recent shootings of African Americans, I personally feel unsafe wearing this device."