"ECMO for Greater Poland": a unique regional program for extracorporeal life support

To the Editor A group of Polish extracorporeal life support enthusiasts is currently launching the first regional extracorporeal membrane oxygenation (ECMO) program, "ECMO for Greater Poland", which is a unique initiative in Poland. It is based on the approach that has already been successfully implemented in many countries around the world (eg, the United States, the Netherlands, Qatar).[1-3] In the near future, the program will allow the use of perfusion therapy for the benefit of Polish people living in the administrative region of Greater Poland (approximately 3.5 million). The program is complex and provides a comprehensive spectrum for applying ECMO perfusion therapy to treat patients in a number of life-threatening and critical states. As such, it appears to be a unique program across the country. The main areas of implementation include: treatment of patients with hypothermia[4]; treatment of reversible severe respiratory failure[5]; treatment of critical states resulting in heart failure, that is, sudden cardiac arrest, cardiogenic shock, or acute intoxication[6]; and promotion of donation after circulatory death (DCD) in selected organ donors after unsuccessful life-saving treatment to achieve organ recovery.[7-9]

It is important to stress that the research linked to the "ECMO for Greater Poland" project is supported by the Polish American Advanced Life Support and Simulations (PAALSS) working group, which has been formed to promote scientific activity and academic collaboration between the United States (US) and Poland. "ECMO for Greater Poland" is a nonprofit project, and all its initiatives are based on voluntary work under the additional auspices of the Polish Society of Simulation Medicine.

The "ECMO for Greater Poland" program organized a symposium in November 2016 together with partners including Virginia Commonwealth University and Hunter Holmes McGuire VA Medical Center from the US as well as the Polish-US Fulbright Commission. The PAALSS cooperates also with other US institutions and plans to expand research and support valuable publications in the near future.

The program will help develop algorithms that are currently unavailable. These algorithms should optimize the organization of the National Medical Rescue System to establish the "ECMO rescue chain". They will also facilitate improvement in the qualifications of medical staff at emergency departments and selected branches of intensive care medicine. To achieve this goal, training of the specialized resuscitation, perfusion, and transplantation teams is mandatory. The main strength of this program is the widespread use of extracorporeal perfusion support. All program arms of ECMO technology applications should be implemented simultaneously to maximize the possible benefits. The program is divided into 3 stages: prehospital, hospital/perfusion, and transplantation.

Undoubtedly, the organizational model described above is complex and expensive; therefore, we propose to use advanced high-fidelity medical simulation to prepare for real-life experience. Currently, the possible advantages of simulation as an educational tool are invaluable. It enables testing of the unlimited training possibilities of implantation, perfusion, and patient transport with ECMO.[10-12] During the first 4 months (September to December 2016) of our program, the following scenarios were created[13]:

1 "ECMO for DCD", which included prehospital identification, cardiopulmonary resuscitation advanced life support (CPR ALS), perfusion therapy (CPR-ECMO or DCD-ECMO), inclusion and exclusion criteria matching, automated chest compression (ACC), transport, DCD confirmation and donor authorization, the venoarterial (VA) cannulation of a mannequin's artificial vessels, and starting on-scene organ perfusion.

2 "ECMO for INTOXICATION", which included hospital identification (a toxicology department), poisoning treatment, CPR ALS, ACC, and VA cannulation for the implementation of ECMO therapy and transport to a referential hospital (cardiac surgery department).

3 "ECMO for RRF" (reversible respiratory failure), which included hospital identification (regional department of intensive care), inclusion and exclusion criteria matching, ECMO team transport (80 km), therapy confirmation, venovenous (VV) cannulation for the implementation of perfusion therapy, and return transport (80 km) with ECMO to another hospital in

a provincial city (clinical department of intensive care), where the VV ECMO therapy was continued for the next 48 hours (simulation "in situ").

4 "ECMO for HYPOTHERMIA", which included prehospital identification, CPR ALS with ACC, special road transport on ACC, and the VA cannulation and perfusion for hypothermia treatment.

The "ECMO for Greater Poland" program with medical simulation in Poland proved successful. Soon after these simulations (scenarios of this scope had probably been performed for the first time in the world), the program arms were verified in real life. The Maastricht category II (donors after unsuccessful resuscitation) DCD procedures were activated several times and resulted in 2 double successful kidney transplantations for the first time in Poland.[14] Additionally, we treated 2 hypothermic patients for the first time in the Greater Poland region and initiated treatment of adult patients with RRF with the use of ECMO. We also conducted a successful road transport (120 km) of the ECMO-supported patient to the referential Department of Intensive Care at our University Hospital. We observed an important role of medical simulation not only as skill testing, but also a tool for creating nonexisting procedures. The results of medical simulation have proved effective in clinical situations.

As the next step, we are planning to create an interactive e-learning platform (based on www.ecmo.pl, the website developed by the authors MP and ML) bringing together the current knowledge and to establish guidelines for perfusion therapy in the above arms. The final aim of our program is to build the procedural chain to identify potential candidates for treatment and effective process of coordination. Successful implementation of our program will result in establishing the highest-reference national ECMO training center in Poland. It will standardize the training methods, allow the testing of novel or common procedures, and facilitate improvement in the skills and qualifications of medical staff.

The activities of the program will promote the care and treatment of patients in critical states, including ECMO therapy, as well as an increase in the number of potential organ donors followed by transplantations in the Greater Poland region. This will also enable the effective use of the existing human and organizational resources with the available technical facilities. Eventually, the use of ECMO and all opportunities it provides will contribute to improvement in the overall health of the society.

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