Revista Portuguesa de Cardiologia 41 (2022) 379–380

Revista Portuguesa de
Cardiologia
Portuguese Journal of Cardiology
www.revportcardiol.org

EDITORIAL COMMENT

Mechanical circulatory support in children

Suporte circulatório mecânico nas crianças

Miguel Abecasis

Serviço de Cirurgia Cardiotorácica, CHLO, Hospital de Santa Cruz, Carnaxide, Portugal

Available online 22 April 2022

Extracorporeal life support (ECLS) began in the 1950s, when John Gibbon built the first heart lung machine. In 1975, Robert Bartlett successfully treated a child using extracorporeal membrane oxygenation (ECMO) for the first time. Unrelated to cardiac surgery, ECMO is implanted in a child for the first time in Portugal in May 2010, being nowadays the respiratory distress syndrome its main indication in children.[1,2]

The creation of an ECLS program (temporary support for pulmonary function and/or cardiac function using mechanical devices) represents a major challenge due to the complex medical and technical nature of the devices and associated learning needs.

These patients pose a challenge to multidisciplinary collaboration between Pediatric Cardiology, Cardiothoracic Surgery, Intensive Medicine, Anesthesia, Clinical Pathology, Immunotherapy and Hemotherapy, Psychiatry, Infusion and Nursing. This collaboration is one of the determining factors for the success of the technique, ensuring maximum safety for the patient and the best outcomes. The continued interaction among those involved, focused on a common goal of solving or exploring a series of interlinked problems, with the possible participation of the child and family, seems utterly fundamental.

Setting up ''core team'' specifically prepared to treat patients on mechanical life support enables timely discussion of the cases, selecting the best candidates and choosing the proper time to start support, minimizing end-organ perfusion injuries,[3] a problem that was identified by the authors.

By definition ECLS (being excluded here fully implantable systems) includes a number of support techniques of which ECMO is just one example. I agree that categorizing them according to type of flow, whether interposition or not an oxygenator with all the disadvantages this entails, makes more sense.

From a strategic point of view, ECMO, in a tertiary center as described, has been losing importance and its use is yet justified, due to the greater familiarity with its implementation, often avoiding central cannulation in situations where a need for very short support is expected or as a bridge to decision. As mentioned by the authors, there has been a growth in importance for both the pulsatile paracorporeal ventricular assist device for implantation in newborns and long-term support, and the paracorporeal continuous-flow ventricular assist device for implantation in children with greater body surface, bridge to recovery, bridge to decision, bridge to transplantation or bridge to another type of device (justified by lack of donors in this age range).

In the future, with the increased experience of the various centers, the next step will be to delay transplant listing after left ventricular assist device implantation, enabling

E-mail address: miguel.e.abecasis@gmail.com

https://doi.org/10.1016/j.repc.2022.01.003

improvement in end-organ function, rehabilitation optimization and even managing patients in the community.[4]

Despite the enormous progress in the management and innovation of this type of equipment, complications both mechanical (thrombi and problems at the level of the cannulas), and clinical (stroke, hemorrhage, multiorgan failure and infection), continue to have a major impact on this type of patients. These complications were also encountered by the authors in their analysis, despite the weaknesses identified in this study.

The authors should be congratulated on the publication of their results in this area. The creation of registers such as The European Registry for Patients with Mechanical Circulatory Support (EUROMACS): EUROMACS Pediatric (Paedi-EUROMACS) report will result in the availability of new data for making clinical decisions for the special population of pediatric patients.[5]

Conflicts of interest

The author has no conflicts of interest to declare.

References

1. Abreu S, Brandão C, Trigo C, et al. Mechanical circulatory support in children: strategies, challenges and future directions. Rev Port Cardiol. 2022;41:371–8.
2. Meireles D, Abecasis F, Boto L, et al. Extracorporeal membrane oxygenation: the first 10 years experience of a Portuguese Pediatric Intensive Care Unit. Acta Med Port. 2021;34:435–41.
3. Bartfay S-E, Dellgren G, Hallhagen S, et al. Durable circulatory support with a paracorporeal device as an option for pediatric and adult heart failure patients. J Thorac Cardiovasc Surg. 2021;161:1454–64.
4. Conway J, Miera O, Adachi I, et al. Worldwide experience of a durable centrifugal flow pumpin pediatric patients. Semin Thoracic Surg. 2018;30:327–35.
5. de By Theo MMH, Antonides CFJ, Schweiger M, et al. The European Registry for Patients with Mechanical Circulatory Support (EUROMACS): second EUROMACS Pediatric (Paedi-EUROMACS) report. Eur J Cardio-Thorac Surg. 2020;57:1038–50.