The hurdles of providing mechanical circulatory support to children with congenital heart disease

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Keywords: Ventricular assist device • Congenital heart disease • Extracorporeal membrane oxygenator

We are now facing an increasing population of previously operated patients with congenital heart disease waiting for heart transplantation. Because of the shortage of donor organs, it is likely that the number of those requiring long-term VAD support will increase. In this perspective, reports such as the one from the team of Newcastle are essential to deepen our understanding of the best strategies to implement in this complex subset of patients [1]. The team is responsible for a large part of the UK population and has accumulated a large experience in this field. As such, we should pay great attention to their experience.

They report an apparent success with bridge to heart transplantation with extracorporeal membrane oxygenator (ECMO). One should be aware that the excellence of the UK organization in the field of heart transplantation ensures a rapid procurement of donor hearts for those placed on urgent listing, a situation that cannot be matched everywhere. It has now been recognized that mortality of patients bridged to heart transplantation with ECMO is higher than the mortality of patients bridged with VAD [2, 3]. It has, therefore, now been recommended that patients waiting for transplantation on ECMO should be transitioned early to VAD, at the latest within 2 weeks of the initiation of the support [4, 5].

Their conclusion that patients with congenital heart disease can be successfully bridged to transplantation with mechanical support is in accordance with the recent statements of those sharing similar experience. However, the poor outcomes described in their patients with single-ventricle physiology do not seem to justify this conclusion. All of their patients supported for more than 8 days with VAD died and none of those supported for more than 15 days survived, which may be interpreted as a failure of this strategy. I believe that lessons can be taken from the Newcastle experience.

A high proportion of their patients were supported from cardiac arrest, signing the severity of the clinical status of the patients at the time of support. The supported patients with single-ventricle physiology were young a likely sign that these patients had a primary failure of their univentricular circulation and one can suspect that a high proportion of them were supported as a rescue strategy from a failed procedure. We know that the use of VAD as a rescue strategy is associated with an extremely high mortality [6]. This high mortality should not prevent us from pursuing this strategy, but push us to implement support very early after a failed intervention, and probably only in selected patients. In our experience from Melbourne, the only patients to survive a VAD support after a failed surgery were supported within 3 days of their operation. Similarly, patients should be supported before cardiac arrest especially when they are bound to a univentricular circulation, as resuscitation will be less efficient in this instance. The poor outcomes encountered in supported patients with single ventricle should encourage us to support these patients earlier.

We have been able to support 2 patients with failing Fontan circulation for one year and 6 months respectively and others have reported similar experience [7].

The report of Newcastle demonstrates that the support of patients with single ventricle is fraught with enormous difficulties, and highlights the fact that we have not identified yet the optimal management of these patients. We should, however, keep in mind that this goal can be achieved. It is certain that circulatory support will be the only option for an increasing number of these patients and it is our duty to make all attempts to improve their outcomes.

Funding

Yves d’Udekem is a Career Development Fellow of The National Heart Foundation of Australia Research Program (CR 10M 5339). The Victorian Government’s Operational Infrastructure Support Program supported this research project.

Conflict of interest: none declared.

REFERENCES


