

Keynote Lecture

1 VENTRICULAR ASSIST DEVICES: DEVELOPMENTS IN ASIA AND GLOBAL OUTLOOK FOR THE NEXT 10 YEARS

Mandeep R Mehra. *Harvard Medical School and Brigham and Women's Hospital, Boston, Massachusetts, USA*

10.1136/heartasia-2019-apahff.1

The advent of left ventricular assist systems to support patients with advanced-stage heart failure has been a 50 year odyssey, now available broadly to such patients.¹ Engineering advances have ushered in an era of small, durable devices that can be fully implanted within the chest. Yet, haemocompatibility related adverse events, which emanate from the interaction between the device and the patient they support are manifest principally in increased stroke rates, *de novo* device thrombosis requiring replacement and in gastrointestinal bleeding (a peculiar adverse event resulting from the unnatural physiology of continuous flow with low systemic pulse pressure).² A novel fully magnetically levitated pump, the HeartMate 3 pump has now been introduced which is engineered with wide blood flow pathways (to decrease shear stress and haemolysis) and programmed with an artificial intrinsic pulse. A large study has demonstrated its superiority in ameliorating pump thrombosis, reducing stroke rates and improving medical resource use and cost of care when compared with other devices such as the HeartMate II pump with a mechanical bearing and axial flow pathway.³ However, much needs to be learned, especially within the Asia Pacific region. Questions of genetic diversity in response to anticoagulation targets, predilection towards haemocompatibility complications and outcomes within this distinct population remain less well understood. Estimates of patient need in this region suggest that over 50 000 eligible patients with advanced heart failure may qualify for such mechanical support but access, cost and regulatory barriers as well as the optimal medical management of these pumps remain poorly understood. In the Asia Pacific realm, >100 centres currently implant such pumps with most performing <10 pumps annually and the top 20% of centres performing the majority of these surgical implants. Japan, Australia, India, Singapore and Taiwan lead the region in experience with durable implantable pumps. As experience ensues, there will be more widespread use and the field continues to await newer pumps that are not only forgiving on end points of adverse events but also forgettable by virtue of eliminating the need to be externally powered through a driveline that exits the body and connects to a power source.¹ Myocardial recovery using haemodynamic support and facilitation of intensified pharmacotherapy is being studied in an effort to improve outcomes and restore patients to a better stage of less severe symptoms but this aspect remains poorly developed.⁴ The future is in smaller pumps that can provide partial support, mimic the physiological; flow pathways and maintain pulsatility. These devices will usher in earlier use and may provide the impetus to facilitate recovery in patients who are not too far advanced.

REFERENCES

1. Mehra MR. Evolving disruption in left ventricular assist systems: Forgiving but not yet forgettable. *Eur J Heart Fail* 2018 December 3. doi:10.1002/ejhf.1340 [Epub ahead of print].
2. Mehra MR. The burden of haemocompatibility with left ventricular assist systems: A complex weave. *Eur Heart J* 2017 February 23. doi:10.1093/eurheartj/ehx036
3. Mehra MR, Goldstein DJ, Uriel N, et al. MOMENTUM 3 Investigators. Two-year outcomes with a magnetically levitated cardiac pump in heart failure. *N Engl J Med* 2018;**378**:1386–1395.
4. Drakos SG, Mehra MR. Clinical myocardial recovery during long-term mechanical support in advanced heart failure: Insights into moving the field forward. *J Heart Lung Transplant* 2016;**35**:413–420.

2 THE HEART TRANSPLANT AND VAD PROGRAM AT ST VINCENT'S HOSPITAL, SYDNEY

Peter S Macdonald. *Heart Transplant Unit, St Vincent's Hospital and University of New South Wales, Sydney, Australia*

10.1136/heartasia-2019-apahff.2

2018 marks the 50th anniversary of heart transplantation at St Vincent's Hospital in Sydney. The modern era of heart transplantation for our institution commenced in 1984 and since then the programme has performed >1000 heart transplants (HTx), >1000 lung transplants and almost 100 combined heart-lung transplants. Bridge-to-transplant ventricular assist device (VAD) support began in 1994 with the pulsatile Heartmate 1 device with a transition to continuous flow VADs in the mid 2000s. Current activity is 20–25 VADs, 40–50 HTx and 50–60 lung transplants per year.

Over the last 3 decades, there has been an increased utilisation of marginal donors including older DBD donors and more recently DCD donors.¹ The latter has been facilitated by utilisation of normothermic machine perfusion (NMP) for donor heart retrieval and transport.² Donor hearts retrieved using NMP now account for 20% of all HTx. This proportion is expected to increase in the future. There have also been major changes in recipient characteristics with increased referral of older patients with advanced heart failure. Assessment of physical frailty together with cognition and depression are now routine for all patients referred for HTx assessment.^{3 4} There has also been an increased reliance on bridge-to-transplant VAD to support patients to transplantation.

Despite these changing donor and recipient characteristics, post-transplant survival remains excellent with a median survival of almost 15 years. HTx remains the most effective therapy for advanced heart failure but is limited by availability of suitable donors. Improvements in donor heart preservation are expected to further increase the availability of this life-saving therapy.

REFERENCES

1. Dhital K, Iyer A, Connellan M, et al. Distant procurement orthotopic heart transplant from donation after circulatory death. *Lancet* 2015;**385**:2585–2591.
2. Macdonald PS, Chew HC, Connellan M, Dhital K. Extracorporeal heart perfusion before heart transplantation: The heart in a box. *Curr Opin Organ Transplant* 2016;**21**:336–342.
3. Jha S, Carter D, Hannu MK, et al. Frailty as a predictor of outcomes in transplant eligible patients with advanced heart failure. *Transplantation* 2016;**100**:429–436.
4. Jha S, Carter D, Hannu MK, et al. Cognitive impairment improves the predictive validity of physical frailty for mortality in patients with advanced heart failure referred for heart transplantation. *J Heart Lung Transplant* 2016;**35**:1092–1100.