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

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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.4 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