Right ventricular assist device implantation for right ventricle failure

Boško Skorić*

University Hospital Centre Zagreb, Zagreb, Croatia

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***ADDRESS FOR CORRESPONDENCE**: Boško Skorić, Klinički bolnički centar Zagreb, Kišpatićeva 12, HR-10000 Zagreb, Croatia. / Phone: +385-1-236-7501 / Email: bskoric3@yahoo.com

ORCID: Boško Skorić, https://orcid.org/0000-0001-5979-2346

Right ventricular failure (RVF) refractory do medical therapy carries a high mortality risk, and circulatory support with right ventricular assist device (RVAD) may be a lifesaving option.[1-3] While surgical RVAD represents a more invasive therapeutical approach that carries about 50% mortality, the use of percutaneous RVAD support may improve outcomes. Acute RVF may result from 1) decreased contractility due to RV myocardial infarction or myocarditis; 2) volume overload, i.e. increase in preload due to excessive transfusions or following LVAD implantation; 3) pressure overload, i.e. increase in afterload during hypoxia, acidosis, or positive pressure ventilation. RV displays distinctive features in comparison to LV, including high complaint and low resistant pulmonary circulation. Accordingly, RV is more sensitive to an increase in afterload. Treatment of acute RVF includes specific causative treatment, optimization of preload, management of arrhythmia, reduction of afterload, and augmentation of contractility. If RVF is refractory, it is crucial to consider mechanical circulatory support on time. Percutaneous RV support includes VA-ECMO, Impella RP axial pump, and ProtekDuo cannula with an extracorporeal centrifugal pump. The selection of the device depends on whether RVF is isolated or part of biventricular failure, and whether it is a consequence of pulmonary artery (PA) disease. Percutaneous or surgically implanted RVAD is an option in isolated RV failure. Although ECMO can be also used in this setting, it is the device of choice if RVF is a consequence of PA disease. In the case of biventricular failure, a patient can be supported with paracorporeal surgically implanted or percutaneous BiVAD or ECMO. Support in RVF may be a bridge-to-recovery, bridge-to-candidacy, bridge-to-heart transplantation, or bridge-to-permanent RVAD. RECOVER RIGHT study showed 73% survival in patients supported with Impella RP. The Protek Duo cannula with internal jugular cannulation allows early ambulation during support. It is crucial to understand the pathophysiology of RVF, i.e. recognize ventricular interdependence with impaired LV filling to avoid futile therapeutical strategies like excessive volume infusion, and to start with mechanical support before irreversible multiorgan failure develops.

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LITERATURE

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