

Paracorporeal right ventricular assist device for acute and chronic right heart failure in carriers of durable left ventricular assist devices

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Background: Right ventricular (RV) failure is a common complication of left ventricular assist devices (LVAD).^{1,2} We describe two cases of durable LVAD carriers requiring acute RV mechanical support provided using the ProtekDuo (LivaNova, IT) cannula, implanted via the right jugular internal vein, bypassing the RV by draining blood from the right atrium to an extracorporeal blood pump (Rotaflow pump, Maquet, DE) and returning it to the pulmonary artery (**Figure 1**).

Case report 1: A 37-year-old male following LVAD implantation in 2016 due to dilated cardiomyopathy, was diagnosed with chronic RV failure in 2018. During a subsequent episode of acute RV failure parenteral furosemide, dobutamine and intermittent levosimendan were started. Due to ensuing cardiogenic shock, veno-arterial extracorporeal membrane oxygenation (VA-ECMO) was placed. Three days later, an upgrade to a paracorporeal RVAD (p-RVAD) by placement of a ProtekDuo cannula and Rotaflow pump providing a flow of 4.15 litres/minute was performed. An improvement of hemodynamic parameters was obtained with the p-RVAD, but while awaiting the high-urgent heart transplantation, multiorgan failure and repetitive infections ensued, leading to the patients' death.

Case report 2: In April 2020, a 28-year-old male earlier diagnosed with dilated cardiomyopathy was admitted for acute heart failure. Echocardiography showed a predominant left ventricular cardiomyopathy with significantly reduced LV ejection fraction of 15%. One week after admission, ventricular fibrillation occurred, terminated by implantable cardioverter-defibrillator. Due to hemodynamic com-

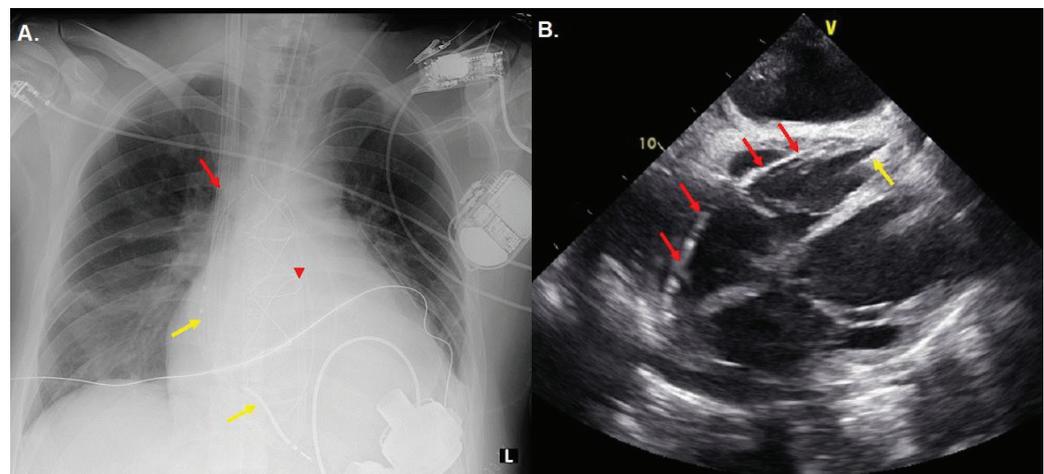


FIGURE 1. A) Chest X-ray after HM3 and ProtekDuo placement. B) Transthoracic echocardiography subcostal 4-chamber view. Red arrows indicate ProtekDuo cannula, red arrowhead indicates the tip of the cannula in the pulmonary artery. Yellow arrows indicate implantable-cardioverter defibrillator electrode.

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promise, dobutamine and norepinephrine were started, but VA-ECMO was required soon thereafter. Three days later, a durable LVAD (HeartMate 3, Abbott, USA) implantation was performed, however the patient was not weanable from cardiopulmonary bypass due to acute RV failure, and promptly received a p-RVAD with the ProtekDuo cannula. Two weeks later, the p-RVAD was successfully weaned and he was discharged a month later and is currently in regular follow-up.

Conclusion: We present two cases of acute and chronic RV failure in LVAD carriers. In both cases, the ProtekDuo cannula enabled acute RV support. Early institution of RV mechanical circulatory support, when needed, should improve patient outcomes.

LITERATURE

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