Early Mobility Of A Patient Status Post Implementation Of A Centrimag Bilateral Ventricular Assist Device: A Case Report

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Background & Purpose: The benefits from early rehabilitation in the ICU have been demonstrated in the literature. While some devices have been evaluated, the mobilization of patients on a bilateral ventricular assist device (BiVAD) have not been described in the literature. The purpose of this case report is to demonstrate the feasibility of early rehabilitation as well as offer safe handling techniques for managing patients on the BiVAD.

Case Description: A patient with no significant past medical history presented with shortness of breath and was admitted with cardiogenic shock. She was treated medically, however, she continued to deteriorate requiring progressively higher level devices: intraaortic balloon pump, ECHMO then eventually Centrimag (Thoratac Corporation) LVAD then RVAD (BiVAD). The BiVAD is two separate devices: one left ventricular assist device (LVAD) and the other a right ventricular assist device (RVAD) that can be implanted separately or together. In this case they were implanted two days apart. The LVAD was first and when the right ventricle continued to fail the RVAD was implanted. The Centrimag is an extracorporal pump device that is centrally cannulated and provides a continuous flow. The device is set on a platform and pole with a wheeled base. Two systems hold the cannulas in place: the surgical technique and an abdominal binder. An interdisciplinary team analyzed and formulated strategies for early rehabilitation for this patient. This team included the surgeon, nurses, physical therapist (PT), occupational therapist, cardiologist, and physician’s assistants. To implement the plan the patient was examined by a PT two days after the BiVAD was in place. The first two sessions of physical therapy the patient performed exercises in bed due to the patient’s mental and hemodynamic

status. At session three the patient began to perform progressive mobility beginning with standing and eventually progressing to ambulation in future sessions. The patient ambulated a total of five times while on the BiVAD with a maximum distance of 75 feet. No adverse events occurred during any of the treatments. With experience and improvement in the patient’s condition, fewer team members were required to support gait training and therapeutic exercise interventions.

**Outcomes**: The BiVAD was implanted in the patient for thirteen days, during which the patient received ten sessions of physical therapy with no adverse events and with improvements in functioning and capacity for physical activity. The patient was in the ICU for a total of 30 days then transferred to the cardiac surgical floor. The patient returned home with home-care services after a 41 day hospital stay.

**Discussion**: This is the first report that rehabilitation for patients with BiVAD is feasible and safe. Interdisciplinary collaboration for decision-making customized to the BiVAD and the unique characteristics of the patient provided interventions that benefitted the patient by preventing impairments and promoting functioning.
