Outcomes of Temporary Ventricular Assist Device: A Pediatric Institutional Experience over 25 Years

Objective: Data regarding temporary ventricular assist device (VAD) support in children is scarce. We sought to review our temporary VAD experience over 25 years at a pediatric center.

Methods: We performed a single-center retrospective review on 108 consecutive patients supported with temporary VADs from 3/1996 to 8/2021. This study was analyzed based on the number of encounters, defined as hospitalizations requiring temporary VAD support. While multiple temporary VAD implants were still considered to be a single encounter if they happened during the same admission, implants in different admissions were identified as separate encounters, even if they occurred in the same patient.

Results: We identified a total of 114 encounters that had involved 126 temporary VAD implants; 76 (60%) extracorporeal centrifugal pump (Rotaflow=49, Biomedicus=24, TandemHeart=3), and 50 (40%) catheter-based axial pump (Impella) were included. There were six encounters associated with multiple admissions in the same patients (4 patients had two encounters, and 1 patient had three encounters). Support type was LVAD (101), RVAD (5), and BiVAD (8). The median (with range) age, weight, and body surface area at VAD placement were 10.1 (1 day-42.8) years, 33.6 (2.5-128) kg, and 1.15 (0.17-2.54) m2, respectively. INTERMACS profile was 1 in 74 (65%) and 2 in 40 (35%) at implantation. Underlying etiology was cardiomyopathy (34, 30%), heart transplant graft dysfunction (29, 25%), congenital heart disease [23, 20% (9 with single ventricle)], myocarditis (22, 19%), and other (6, 5%). The median support duration was 5 (1-45) days. Following temporary VAD support, 97 (85%) encounters had positive outcomes, including bridge to recovery (55, 48%), bridge to long-term VAD [31, 27% (17 subsequently bridged to transplant)], and bridge to transplant (11, 10%), while 17 (15%) died during temporary VAD support. The cause of death included multiorgan failure (11, 65%), neurologic dysfunction (4, 23%), cardiac arrest (1, 6%), and other (1, 6%). Overall, 87 (76%) encounters resulted in hospital discharge, while 27 (24%) led to in-hospital mortalities. At the latest follow-up for 87 hospital survivors, 17 (20%) resulted in death, while the remaining 70 (80%) are alive with a median follow-up duration of 3.7 (23 days-19.8) years. Among the 70 alive outpatients, six received heart transplant, and two are supported with durable VAD awaiting transplant. One patient underwent durable VAD explant due to cardiac recovery. Survival rates for 87 hospital survivors at 6-month, 1-year, 5-year, and 10-year were 96%, 92%, 82%, and 68%, respectively.

Conclusions: Temporary VAD support played an important role at a pediatric heart center, by bridging the patient to a clinically appropriate destination based on the individual need.

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All Temporary VAD Encounters  
n=114

Bridge to Transplant  
n=28

Bridge to Long-term VAD  
n=31

Bridge to Recovery  
n=55

Discharged Home  
n=87 (76%)

In-hospital Death  
n=27 (24%)