

A single institutional experience with 65 children supported with the Berlin Heart Ventricular Assist Device over 16 years: Comparison of patients with biventricular versus univentricular circulation

Objective:

To evaluate outcomes in patients supported with the Berlin Heart Ventricular Assist Device, comparing those with functionally univentricular circulation to those with biventricular circulation.

Methods:

We retrospectively reviewed 65 pediatric and congenital heart disease patients. The primary outcome was mortality. Kaplan-Meier methods and log-rank tests were used to assess group differences in long-term survival. T-tests using KM-estimated survival proportions and standard errors were used to compare groups at specific time points.

Results:

40 patients with biventricular circulation were supported (Age [years]: mean \pm standard deviation (SD) = 4.1 \pm 4.8, median=1.3, range=17 days-16 years; Weight [kilograms]: mean \pm SD=15.0 \pm 15.6, median=7.5, range=3.1-60), including 37 BiVAD and 3 LVAD only. In biventricular patients, duration of VAD support [days]: mean =99.9, median=88.5, range=2-315. Of 40 biventricular patients, 30 underwent heart transplantation, 5 died on VAD, 4 weaned off VAD (1 of whom underwent heart transplantation 334 days after weaning), and 1 is still on VAD.

25 patients with univentricular circulation were supported with single VAD (SVAD) (Age [years]: mean \pm SD=2.0 \pm 3.6, median=34 days, range=4 days-13 years; Weight [kilograms]: mean \pm SD=7.7 \pm 8.1, median=4, range=2.4-32.6). In univentricular patients, duration of VAD support [days]: mean=149.3, median=142, range=4-310. Of 25 univentricular patients, 18 underwent heart transplantation, 6 died on VAD, and 1 is still on VAD.

One-year survival was 84.5% (95% CI=73.8%-96.7%) in biventricular patients and 70.5% (95% CI=54.3%-91.5%) in univentricular patients, $p=0.102$. Five-year survival was 80.8% (95% CI=68.8%-94.9%) in biventricular patients and (64.1% CI=46.5%-88.4%) in univentricular patients, $p=0.09$.

Figure 1 documents the longitudinal Kaplan-Meier survival (log-rank $P=0.2$) and reveals no statistically significant difference between the groups.

Conclusions: Berlin Heart VAD facilitates bridge to transplantation in neonates, infants, and children with functionally univentricular circulation, with outcomes nearly as good as those with biventricular circulation.

Survival By Ventricular Status

