Research Letter

Driving Pulseless: A Driving Survey of Patients With Left Ventricular Assist Devices and Their Providers

With the introduction of left ventricular assist devices (LVADs), the patient with advanced heart failure may experience extended and improved quality of life. This growing population is now raising unique questions for the medical community regarding limitations and safety. Of interest is the subject of driving with an LVAD. In 2012 the Canadian Cardiovascular Society indicated that stable patients supported with an LVAD may resume driving 2 months after implantation.[1] However, no consensus recommendation currently exists in the United States. We sought to further understand the driving practices of our center's LVAD population, its prevalence and safety, and our providers' awareness of state and institutional recommendations.

Methods

We used an Institutional Review Board−approved cross-sectional paper-based survey at the University of Rochester Medical Center. The population comprised all patients who had received an LVAD, were over the age of 18 years, ≥3 months after implantation, and presented to their outpatient clinic appointment February−September 2017. Each patient was provided with an anonymous survey and assigned a numeric label which allowed for additional clinical and demographic information gathering post hoc by a study investigator who was not an LVAD provider. A locked survey box was provided to facilitate confidential survey return. Collected survey data included questions related to driving habits before and after LVAD implantation, and alarm history. An anonymous survey was also conducted of our institution's LVAD providers and included questions about knowledge of New York state law, institutional driving policy, and opinions regarding driving with an LVAD. Demographics and survey results were expressed as a n (%) for categoric variables, and mean ± SD for continuous variables. Comparisons of independent groups were performed with the use of the chi-squared test or Fisher exact test for categoric variables and Wilcoxon 2-sample test for continuous variables. Statistical analyses were performed with the use of SAS 9.4 software (SAS Institute, Cary, North Carolina).

Results

There were 131 patients identified for participation. Nine were excluded: 5 died before the study began, and 4 were inpatients during the survey period. Eighty-four surveys (69%) were returned completed, and 38 patients (31%) declined to participate or missed their clinic appointment during the study period.

The average age of respondents was 61 ± 13 years. Before LVAD implantation, 75 (89%) were driving (Supplemental Table 1). After LVAD implantation, 66 (79%) were driving; all reported that they felt comfortable doing so. Compared with patients who did not resume driving, drivers were more likely to be men, serve as the primary driver for their household, and report more miles per week before LVAD implantation (Table 1). Other clinical characteristics were similar between the 2 groups, including previous stroke and bleeding events. Of the

Table 1. Patient Characteristics: Patients Who Drove After LVAD Implantation Versus Those That Did Not

Demographics	Driving After LVAD (n = 66)	Not Driving After LVAD (n = 18)	*P* Value
Male	60 (91)	11 (61)	.001*
Age (y)	62 ± 11	56 ± 19	.345
Stroke before survey	5 (8)	3 (17)	.351
Major bleeding event before survey	20 (30)	5 (28)	1.00
Implant to survey date (mo)	32.8 ± 20.0	35.8 ± 27.8	.612
Initial hospitalization length of stay (d)	21.2 ± 18.8	15.8 ± 7.8	.246
Primary driver of household before LVAD	56 (85)	6 (33)	.003*
Average miles/wk driving before LVAD	175 ± 188	76 ± 80	.041*
Average d/wk spent driving before LVAD	6 ± 1.4	4 ± 3.0	.001*
History of sustained ventricular tachycardia	30 (45)	7 (39)	.618

Results were expressed as a n (%) or mean ± SD.
*$P < 0.05$.

drivers, 28 (42%) resumed driving <3 months after implantation, 31 (47%) within 3−6 months, and 7 (11%) after 6 months. Most reported driving 7 days a week, with common reasons cited as medical necessity and work. Eight patients (12%) reported experiencing LVAD alarms while driving which were related to low battery alerts. All were able to be safely addressed by pulling over to the side of the road. Reasons for not driving after implantation included 14 (78%) who were instructed by a provider not to drive, and 4 (22%) reporting a fear to drive. Seven participants reported that they were instructed not to drive but drove anyway.

Fifteen provider surveys were distributed, and 13 (87%) were returned completed. All correctly reported there is no New York State law regarding driving with an LVAD, but only 8 (62%) addressed driving with their patients. Although there was no formal written institutional policy, recommendations against driving included sternal precautions, narcotics use, or history of syncope or arrhythmias. Ten providers (77%) underestimated the percentage of patients who returned to driving. All providers thought that patients with an LVAD should be allowed to drive, with specific restrictions on a patient-dependent basis.

Discussion

Similarly to other small studies, our findings suggest that driving with an LVAD is common.[2–4] It also highlights a critical lack of expert consensus. LVAD referral centers should be encouraged to establish clear institutional policies for their patients and expert providers. The ability to drive can be a key component to a patient's quality of life, and as such represents an important issue for further study. Limitations of the present study include recall bias and underreporting of driving complications owing to the voluntary nature of the survey. It should also be noted that our findings are applicable to a small sample of ambulatory and stable patients.

Disclosures

None.

Supplementary Materials

Supplementary material associated with this article can be found in the online version at doi:10.1016/j.cardfail.2019.02.003.

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