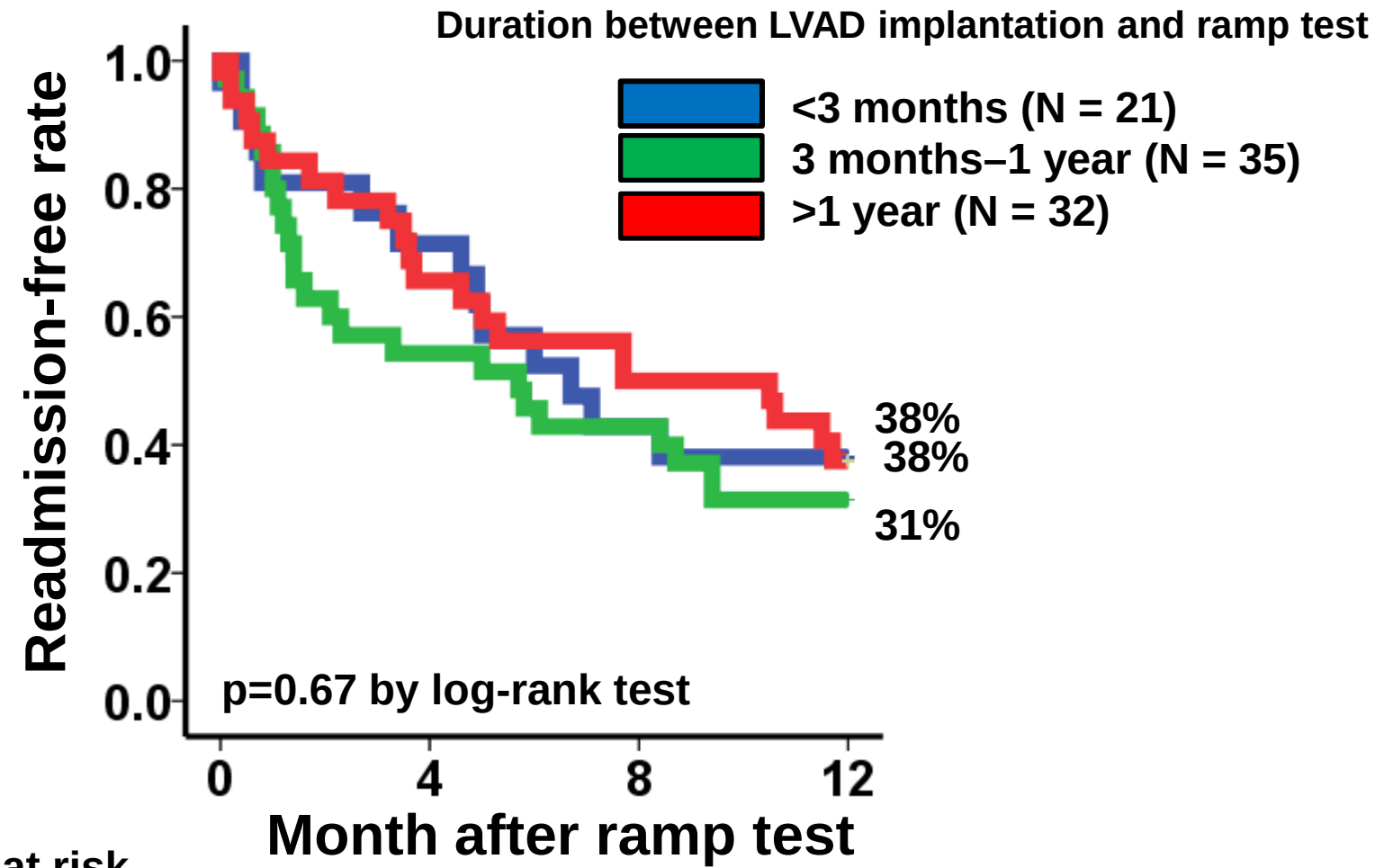
SUPPLEMENTAL MATERIAL

Appendix Figure 1. Readmission-free survival rates stratified into three groups by the duration between LVAD implantation and ramp test (within three months, three months to one year, and over one year)



Number at risk

<3 months:	21	9	8	7
3 months–1 year:	35	20	15	10
>1 year:	32	25	16	11

Appendix Figure 1

Appendix Table 1. Echocardiographic and hemodynamic change in six patients whose hemodynamics worsened during ramp test

	Baseline LVAD speed										Set LVAD speed									
	RPM	AV open	AI	MR	CVP	PCWP	CI	CVP<12	PCWP<18	CI>2.2	RPM	AV open	AI	MR	CVP	PCWP	CI	CVP<12	PCWP<18	CI>2.2
A	2900	0	1	0	10	17	3.00	1	1	1	2900	0	0	0	11	21	3.00	1	0	1
B	2800	0	2	1	10	17	2.88	1	1	1	2800	0	1	1	10	18	3.14	1	0	1
C	8800	0	0	0	2	2	2.44	1	1	1	8800	0	0	0	1	1	2.11	1	1	0
D	9600	0	2	0	10	10	6.07	1	1	1	9600	0	1	0	13	12	5.94	0	1	1
E	9400	0	4	0	10	13	3.00	1	1	1	9200	0	2	0	13	16	2.82	0	1	1
F	9400	0	4	0	3	3	2.21	1	1	1	9000	0	2	0	4	3	1.90	1	1	0

LVAD, left ventricular assist device; RPM, rotation per minute; AV, aortic valve; AI, aortic insufficiency; MR, mitral valve regurgitation; CVP, central venous pressure; PCWP, pulmonary capillary wedge pressure; CI, cardiac index.

LVAD speeds remained unchanged in four patients (A-D), but they failed to achieve one hemodynamic goal at set LVAD speed.

LVAD speeds were decreased in two patients (E and F) to improve the degree of aortic insufficiency, which reduced from grade 4 (moderate) to grade 2 (mild). However, both patients failed to achieve one hemodynamic goal at set LVAD speed.

Appendix Table 2. Changes in medications during one month following ramp test

	Optimized group (N = 54)	Non-optimized group (N = 34)	p value
Diuretics dose			0.21
Increased	10 (19%)	12 (35%)	-
Unchanged	33 (61%)	16 (47%)	-
Decreased	11 (20%)	6 (18%)	-
Beta-blocker dose			0.85
Increased	9 (17%)	6 (18%)	-
Unchanged	42 (78%)	27 (79%)	-
Decreased	3 (6%)	1 (3%)	-
ACEI/ARB dose			0.27
Increased	8 (15%)	9 (26%)	-
Unchanged	42 (78%)	21 (62%)	-
Decreased	4 (7%)	4 (12%)	-
Aldosterone antagonist dose			0.19
Increased	8 (15%)	2 (6%)	-
Unchanged	41 (76%)	31 (91%)	-
Decreased	5 (9%)	1 (3%)	-

ACEI, angiotensin-converting enzyme inhibitor; ARB, angiotensin receptor blocker.

Appendix Table 3. Comparison in baseline characteristics between optimization-achieving group and still non-optimized group among baseline non-optimized group (N = 44)

	Optimization-achieving group (N = 16)	Still non-optimized group (N = 28)	p value
Age, years	60 (53, 66)	62 (53, 72)	0.52
Gender, male	10 (63%)	17 (61%)	0.58
Race, Caucasian	10 (63%)	16 (57%)	0.39
Body mass index	31.1 (22.9, 33.9)	27.6 (22.7, 32.1)	0.59
Pre-ramp LVAD duration, days	328 (85, 921)	370 (120, 947)	0.71
Non-ischemic etiology	6 (38%)	18 (64%)	0.080
Destination therapy	8 (50%)	24 (86%)	0.011*
HeartMate II device	10 (63%)	21 (75%)	0.38
CVP, mmHg	10 (6, 13)	14 (9, 16)	0.025†
PCWP, mmHg	16.9 ± 4.2	17.3 ± 5.6	0.81
CI, L/min/m^2	2.43 (2.10, 2.57)	2.21 (2.01, 2.88)	0.63
PAPi	1.9 (1.6, 2.7)	1.3 (1.0, 2.2)	0.19
Change in LVAD speed			
Decreased	1 (6%)	4 (14%)	0.42
Unchanged	2 (13%)	9 (32%)	0.15
Increased	13 (81%)	15 (53%)	0.063

LVAD, left ventricular assist device; CVP, central venous pressure; PCWP, pulmonary capillary wedge pressure; CI, cardiac index; PAPi, pulmonary artery pulsatility index. *p <0.05 by Fischer's exact test. †p <0.05 by unpaired t-test.

Appendix Table 4. All-cause readmission rate in the sub-groups stratified by the changes in hemodynamics during ramp test

	Event number	Observational duration (day)	All-cause readmission rate (events/year)	IRR (95% CI)	p value
Optimized at baseline LVAD speed (N = 44)					
Optimized at set LVAD speed (N = 38)	36	13634	0.96	0.38 (0.13–1.13)	0.079
Non-optimized at set LVAD speed (N = 6)	12	1890	2.32		
Non-optimized at baseline LVAD speed (N = 44)					
Optimized at set LVAD speed (N = 16)	22	4820	1.67	0.64 (0.30–1.37)	0.26
Non-optimized at set LVAD speed (N = 28)	80	9860	2.96		

LVAD, left ventricular assist device; IRR, incidence rate ratio; CI, confidence interval. Variables were compared by negative binomial regression analysis

Appendix Table 5. Clinical parameters at three months following ramp test

	Optimized group (N = 54)	Non-optimized group (N = 34)	p value
New York Heart Association functional class			0.13
Class I	24 (44%)	12 (35%)	-
Class II	29 (54%)	18 (53%)	-
Class III	1 (2%)	4 (12%)	-
Laboratory data			
Hemoglobin, g/dL	12.1 ± 1.3	11.6 ± 1.5	0.079
Hematocrit, %	36.6 (33.4, 39.1)	36.1 (33.4, 38.9)	0.70
eGFR, mL/min/1.73m^2	56 (45, 68)	45 (38, 61)	0.056
Serum total bilirubin, mg/dL	0.5 (0.4, 0.7)	0.8 (0.6, 0.9)	0.025*

eGFR, estimated glomerular filtration ratio.

*p <0.05 by Mann-Whitney U test.

Appendix Table 6. All-cause readmission rates before and after ramp test

	Pre-ramp period	Post-ramp period
Entire cohort (N = 88)	1.02 events/year	1.81 events/year
Optimized group (N = 54)	1.13 events/year	1.15 events/year
Non-optimized group (N = 34)	0.97 events/year	2.86 events/year