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Both Patient and Caregiver Factors are Related to Patient Health-related Quality of Life Before Surgery: Findings from the Sustaining Quality of Life of the Aged: Transplant or Mechanical Support (*SUSTAIN-IT*) study

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I **will not** discuss off label use and/or investigational use of drugs/devices.

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**Both Patient and Caregiver Factors are Related to Patient Health-related Quality of Life Before Surgery:
Findings from the Sustaining Quality of Life of the Aged:
Transplant or Mechanical Support (*SUSTAIN-IT*) study**

by

Grady KL, Xu Y, Andrei AC, Warzecha A, Kao A, Hsich E, Dew MA, Kormos R, Pham D, LaRue S, Petty M, Cotts W, Pamboukian S, Pagani F, Lampert B, Johnson M, Murray M, Takeda K, Yuzefpolskaya, Silvestry S, Spertus J, Kirklin JK, Collum SC, Yancy C.



SUSTAIN-IT Background & Purpose

Background

- Health-related quality of life (HRQOL) outcomes are very relevant for older patients with advanced heart failure (HF)
- Older patients with advanced HF are being treated more frequently with surgery, including
 - Heart transplantation (HT) & mechanical circulatory support (MCS) as destination therapy (DT)
- There is a paucity of literature on factors related to HRQOL of these older patients, which may guide interventions.

Purpose

The purpose of our study is to compare HRQOL outcomes in older (60-80 years) advanced HF patients who undergo HT or DT MCS and their caregivers, risk factors for poor HRQOL, adverse event and symptom burden, and quality-adjusted life years (QALYs).

Purpose / Design / Timeline

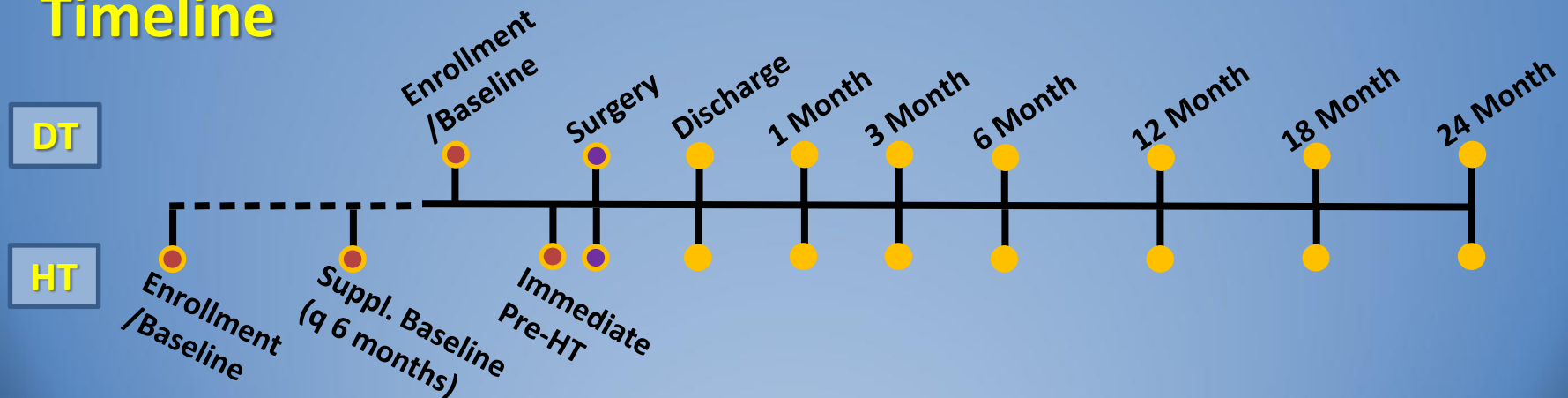
Primary Aim

- To determine whether older advanced HF patients who undergo DT MCS, as compared to patients who undergo HT, experience non-inferior change in overall HRQOL from baseline through 2 years after surgery.
- Purpose of this report: to identify patient and caregiver factors related to HRQOL of patients (60-80 years) awaiting MCS and HT.

Design

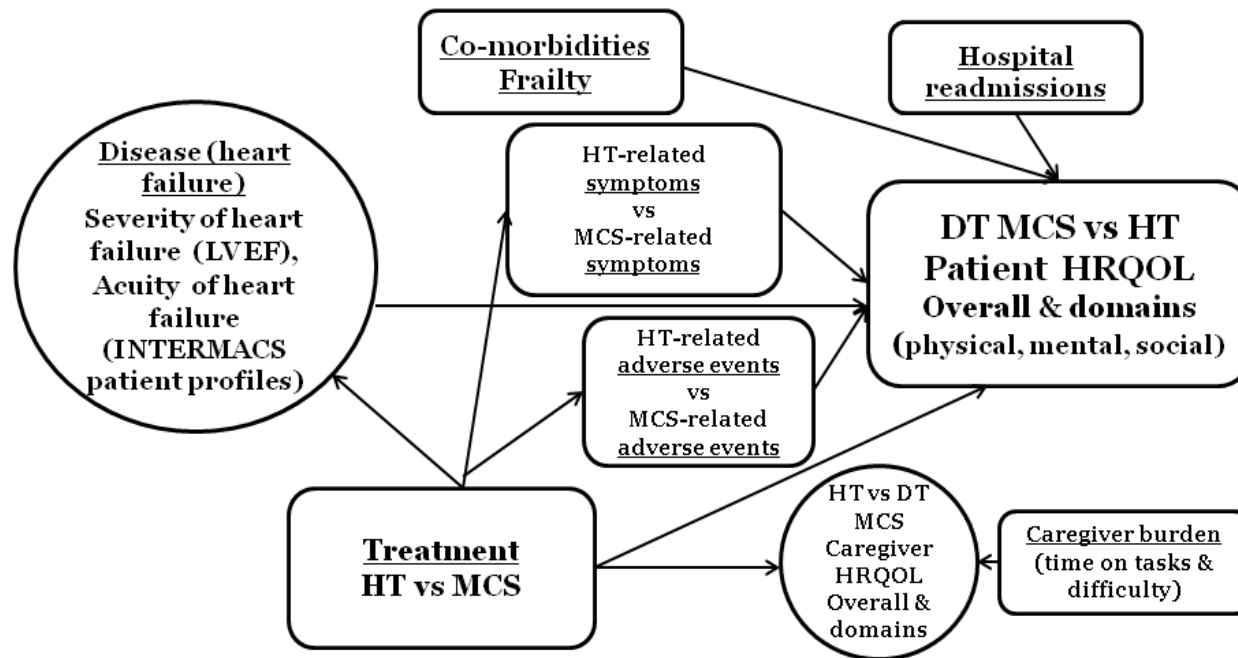
Prospective, longitudinal, multi-site, observational, comparative effectiveness research design

Timeline



Theoretical Framework

Figure 4. Theoretical Framework of the Effect of Disease and Treatment on HRQOL*, modified



**Spilker and Revicki, Quality of Life and Pharmacoeconomics in Clinical Trials, 1996.*

LVEF=left ventricular ejection fraction, INTERMACS = Interagency Registry for Mechanically Assisted Circulator Support; HT=heart transplantation; MCS=mechanical circulatory support, DT = destination therapy, and HRQOL=health-related quality of life

Sites

Northwestern University, Chicago, IL

Advocate Christ Medical Center, Oak Lawn, IL

Cleveland Clinic, Cleveland, OH

Florida Hospital, Maitland, FL

Columbia University, New York, NY

Ohio State University, Columbus, OH

St. Luke's Hospital of Kansas City, Kansas City, MO

University of Alabama, Birmingham, AL

University of Michigan, Ann Arbor, MI

University of Minnesota Medical Ctr, Minneapolis, MN

University of Pittsburgh, Pittsburgh, PA

University of Wisconsin, Madison, WI

Washington University, St. Louis, MO

Sample: Inclusion/Exclusion Criteria

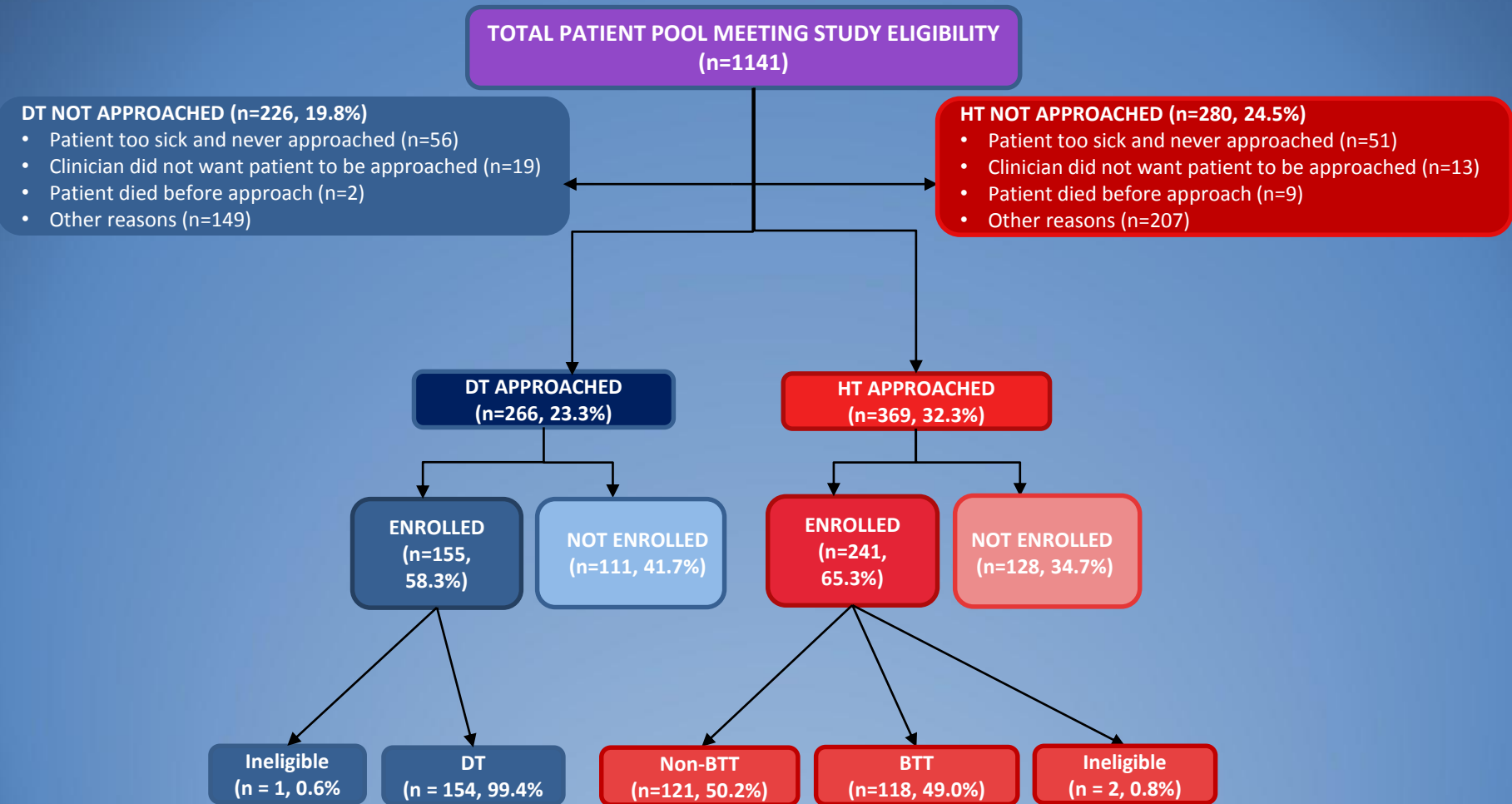
Inclusion criteria:

- Advanced HF
 - listed with the United Network for Organ Sharing (UNOS) for a “primary” HT (with or without a BTT VAD)
- or
- being considered for or scheduled to receive a “primary” DT LVAD with a low probability of cross over to HT (<35% at 2 years) in the site investigator’s opinion
- Ages 60-80 years
- Able to speak, read, and understand English
- Willing to participate and ability to provide informed consent

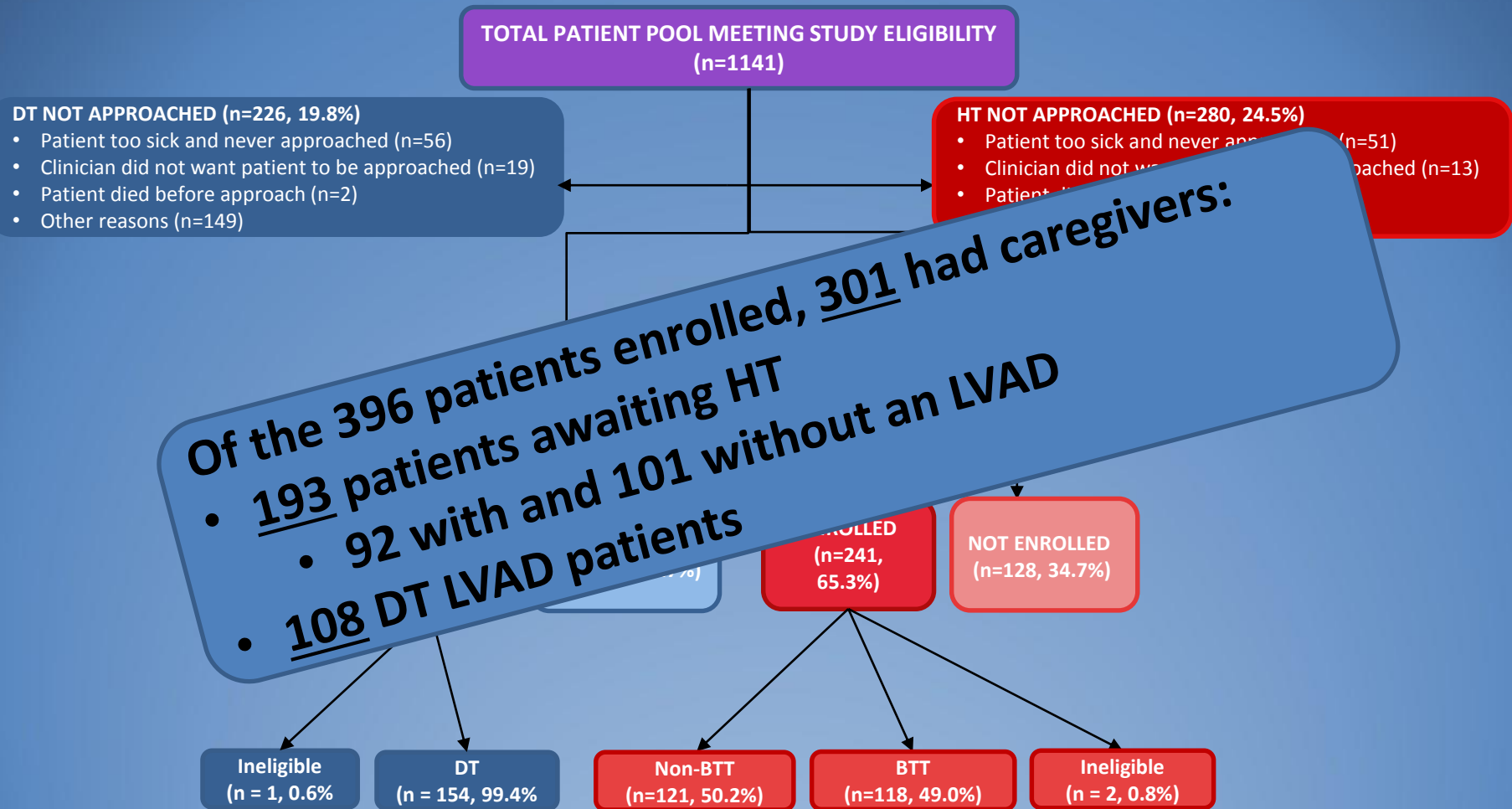
Exclusion criteria:

- HT candidate has a prior HT or DT MCS candidate has a prior MCS device
- HT candidate is listed for multiple organ transplantation

Sample (10/1/15 – 12/31/18)



Sample (10/1/15 – 12/31/18)



Self-report Instruments (Baseline)

- **EQ-5D-3L** (*patient & caregiver*)
 - Generic health profile
 - 5 questions on dimensions of HRQOL and 1 visual analog scale (VAS)
- **KCCQ-12** (*patient only*)
 - Heart failure specific questionnaire (12 items)
 - 4 domains:
 - symptom frequency, physical limitation, social limitation, quality of life
 - Summary score = combination of all domains
- **PHQ-8** (Personal Health Questionnaire) (*patient & caregiver*)
 - Screen for depression (8 items)
- **STAI-state** (State-Trait Anxiety Inventory-state form) (*patient & caregiver*)
 - Measure of state anxiety (20 items)
 - *State anxiety is a more temporary feeling in response to specific situations, demands, or an event that is perceived of as a threat*
- **OCBS** (Oberst Caregiver Burden Scale) (*caregiver only*)
 - 2 subscales: time and difficulty (15 items)

Procedures and Statistics

PROCEDURES

- Approval from all IRBs; written consent from participants
- Participants completed self-report HRQOL surveys before surgery and after surgery (3, 6, 12, 18, & 24 mos)
- Medical records data were collected by sites or downloaded from Intermacs at regular intervals

STATISTICAL ANALYSES

- Descriptive statistics
 - mean \pm standard deviation (SD)
 - counts/percentages
- Multivariable logistic regression models
 - binary outcomes were whether individual EQ-5D VAS and KCCQ-12 SSs were higher than the cohort median of 60 and 46, respectively

5% significance level

Patient Demographics

Patient Characteristics						
Variable	N	Entire Cohort (N=301)	DT (N=108)	HT_BTT (N=92)	HT_NonBTT (N=101)	P- value
Age (years) (mean±SD)	301(108,92,101)	66.0 ± 4.5	68.9 ± 5.1	64.6 ± 3.4	64.3 ± 2.9	<.001
Gender (Female), No. (%)	301(108,92,101)	55 (18%)	15 (14%)	15 (16%)	25 (25%)	0.107
Race (White), No. (%)	301(108,92,101)	260 (86%)	97 (90%)	77 (84%)	86 (85%)	0.411
Married, No. (%)	289(98,90,101)	245 (85%)	84 (86%)	78 (87%)	83 (82%)	0.656
Education (more than HS), No. (%)	261(80,80,101)	182 (70%)	55 (69%)	54 (68%)	73 (72%)	0.765
Currently Working, No. (%)	270(89,82,99)	42 (16%)	11 (12%)	15 (18%)	16 (16%)	0.552
Insurance Type, No. (%)	299(107,92,100)					0.018
Medicare/Medicaid		183 (61%)	76 (71%)	55 (60%)	52 (52%)	
Private Insurance		116 (39%)	31 (29%)	37 (40%)	48 (48%)	

Patient Clinical Characteristics

Patient Characteristics										
Variable	N	Entire Cohort (N=301)		DT (N=108)		HT_BTT (N=92)		HT_NonBTT (N=101)		P- value
Number of Comorbidities (mean±SD)	301(108,92,101)	4.2	± 1.9	4.9	± 2.0	4.1	± 1.8	3.7	± 1.7	<.001
HF Etiology, No. (%)	301(108,92,101)									0.039
. Ischemic Cardiomyopathy		146	(49%)	60	(56%)	46	(50%)	40	(40%)	
. Dilated Cardiomyopathy		126	(42%)	34	(31%)	40	(43%)	52	(51%)	
. Other		29	(10%)	14	(13%)	6	(7%)	9	(9%)	
NYHA Class at Study Enrollment, No. (%)	281(96,84,101)									<.001
. I		15	(5%)	0	(0%)	13	(15%)	2	(2%)	
. II		47	(17%)	1	(1%)	36	(43%)	10	(10%)	
. III		98	(35%)	10	(10%)	27	(32%)	61	(60%)	
. IV		121	(43%)	85	(89%)	8	(10%)	28	(28%)	
INTERMACS Profile at Enrollment, No. (%)	177(93,84,NA)									0.188
. Profile 1		28	(16%)	11	(12%)	17	(20%)	NA	(.%)	
. Profiles 2-3		123	(69%)	70	(75%)	53	(63%)	NA	(.%)	
. Profiles 4-7		26	(15%)	12	(13%)	14	(17%)	NA	(.%)	

HRQOL at Baseline

Patient Assessments						
Variable	N	Entire Cohort (N=301)	DT (N=108)	HT_BTT (N=92)	HT_NonBTT (N=101)	P-value
EQ-5D: VAS Score (mean±SD)	283(93,89,101)	55.3 ± 23.5	43.5 ± 21.7	68.4 ± 18.7	54.8 ± 23.1	<.001
EQ-5D: Mobility (% Problems), No. (%)	281(92,89,100)	154 (55%)	62 (67%)	37 (42%)	55 (55%)	0.002
EQ-5D: Self-Care (% Problems), No. (%)	281(92,89,100)	98 (35%)	50 (54%)	27 (30%)	21 (21%)	<.001
EQ-5D: Usual Activities (% Problems), No. (%)	282(92,89,101)	194 (69%)	76 (83%)	52 (58%)	66 (65%)	0.001
EQ-5D: Pain/Discomfort (% Problems), No. (%)	281(92,89,100)	145 (52%)	49 (53%)	41 (46%)	55 (55%)	0.437
EQ-5D: Anxiety/Depression (% Problems), No. (%)	281(92,89,100)	104 (37%)	42 (46%)	35 (39%)	27 (27%)	0.024

EQ-5D-3L: Range of VAS scores

VAS: 1=worst imaginable health state – 100=best imaginable health state

HRQOL at Baseline (cont.)

Patient Assessments						
Variable	N	Entire Cohort (N=301)	DT (N=108)	HT_BTT (N=92)	HT_NonBTT (N=101)	P-value
KCCQ-12: Summary (mean+SD)	284(94,89,101)	47.5 ± 22.5	34.3 ± 19.4	59.6 ± 20.5	49.1 ± 20.4	<.001
KCCQ-12: Physical Limitation (mean+SD)	279(90,88,101)	49.2 ± 26.0	36.7 ± 24.9	56.3 ± 24.2	54.0 ± 24.7	<.001
KCCQ-12: Symptom Frequency (mean+SD)	284(94,89,101)	59.4 ± 25.8	45.9 ± 23.6	72.3 ± 21.8	60.6 ± 25.0	<.001
KCCQ-12: Quality of Life (mean+SD)	284(94,89,101)	36.0 ± 26.8	21.9 ± 21.8	51.0 ± 27.1	36.0 ± 23.8	<.001
KCCQ-12: Social Limitation (mean+SD)	275(87,88,100)	45.5 ± 29.4	31.8 ± 26.3	58.9 ± 26.4	45.7 ± 29.1	<.001
PHQ-8: Total Score (mean+SD)	293(103,89,101)	6.5 ± 5.2	8.6 ± 5.9	4.9 ± 4.7	5.8 ± 4.0	<.001
Patient PHQ-8 ≥ 10: No. (%)	293(103,89,101)	72 (25%)	40 (39%)	13 (15%)	19 (19%)	<.001
STAI-state: Total Score (mean+SD)	293(103,89,101)	36.5 ± 11.5	39.7 ± 11.4	35.5 ± 12.1	34.2 ± 10.3	0.002
MoCA: Total Score (mean+SD)	277(100,84,93)	25.2 ± 3.4	23.8 ± 3.8	25.6 ± 2.8	26.4 ± 2.7	<.001

KCCQ-12: range of scores = 1-100 (1 = lowest health status; 100 = highest health status)

PHQ-8: range of scores = 0-24 (score ≥10 = positive depression screen)

STAI: range of scores = 20-80 (higher score = more anxiety)

MoCA: range = 0-30 (<26 = cognitive dysfunction)

Factors related to Patient HRQOL

Multivariable Logistic Regression Model for Patient <u>EQ-5D VAS Score > 60</u> (Cohort Median Value)				
Effect	Odds Ratio	95% Confidence Interval	P-value	Overall P-value
Patient Cohort (Reference Group HT no LVAD)				<0.001
DT	0.40	(0.20, 0.80)	<0.001	
HT LVAD	2.29	(1.21, 4.34)	<0.001	
PT PHQ-8 ≥ 10 vs PHQ-8 < 10	0.09	(0.03, 0.25)	<0.001	<0.001
PT STAI Total Score (lower quartile Q1=28, median Q2=36, upper quartile Q3=44) [Reference Group: PT STAI total < lower quartile Q1=28]				0.091
CG STAI total > Q1, but $\leq M$	1.27	(0.62, 2.63)	0.103	
CG STAI total > M, but $\leq Q3$	0.47	(0.22, 0.99)	0.018	
CG STAI total > Q3	0.90	(0.40, 2.03)	0.850	

Factors related to Patient HRQOL

Multivariable Logistic Regression Model for Patient KCCQ-12 SS > 46

(Cohort Median Value)

Effect	Odds Ratio	95% Confidence Interval	P-value	Overall P-value
Patient Cohort (Reference Group HT no LVAD)				<0.001
DT	0.50	(0.24, 1.03)	<0.001	
HT LVAD	2.68	(1.25, 5.73)	<0.001	
PT PHQ-8 ≥ 10 vs PHQ-8 < 10	0.06	(0.02, 0.17)	<0.001	<0.001
PT STAI Total Score (lower quartile Q1=28, median Q2=36, upper quartile Q3=44) [Reference Group: PT STAI total < lower quartile Q1=28]				0.088
CG STAI total > Q1, but \leq Q2	0.71	(0.31, 1.62)	0.47	
CG STAI total > Q2, but \leq Q3	0.360	(0.16, 0.83)	0.065	
CG STAI total > Q3	0.47	(0.19, 1.15)	0.43	
OCBS time mean (lower quartile Q1=1.87, median Q2=2.27, upper quartile Q3=2.73) [Reference Group: OCBS time mean < lower quartile Q1=1.87]				0.015
OCBS time mean > Q1, but \leq Q2	1.71	(0.76, 3.81)	0.061	
OCBS time mean > Q2, but \leq Q3	1.52	(0.60, 3.86)	0.22	
OCBS time mean > Q3	0.45	(0.20, 1.02)	0.002	

Conclusions

- **Prior to surgery, DT candidates had worse HRQOL (both overall and for most domains) than HT candidates.**
 - **HRQOL was lower in patients awaiting HT without MCS than patients with MCS.**
- **Implant strategy, patient depressive symptoms, and caregiver time spent on care were significantly related to older advanced heart failure patient HRQOL.**

Implications

Findings may inform interventions for heart failure patients awaiting surgery.

**“And in the end, it’s not the
years in your life that counts,
it’s the life in your years.”**

Abraham Lincoln

