

**Supplemental Table 1: Search terms**

/	Quality of life	OR
	EuroQoL-5 Dimensions-5 Levels (EQ-5D-5L)	OR
	Minnesota Living with Heart Failure (MLHF)	OR
	Kansas City Cardiomyopathy Questionnaire (KCCQ)	
/	Exercise	OR
	Six minute walk test	OR
	Six-minute walk test	OR
	Peak oxygen uptake	OR
	Exercise capacity	OR
	Peak oxygen consumption	OR
	Exercise training	OR
	Cardiac rehabilitation	
AND	Ventricular assist device	OR
	Continuous-flow Left ventricular assist device	

**Supplemental table 2: Predictors table**

**QOL (with or without FC)**

Hayes et al. 2012 QOL: Exercise intervention did not cause a greater increase in QOL.

FC: Exercise intervention did not cause a greater increase in FC.

Kerrigan et al. 2013 QOL:

1. VO<sub>2</sub> values correlated with KCCQ clin summary score (P=0.045).
2. Muscular strengths (torque, peak) associated with KCCQ (P=0.019).

Of note: 6MWT, LVEF, age: P>5%.

FC: No predictors found (6MWT did not predict VO<sub>2</sub>).

Jakovljevic et al. 2014 QOL: NA but recommended: strategies targeting low levels of physical activity should now be explored to improve recovery of LVADs.

FC: NA.

Kerrigan et al. 2014 QOL: Changes in the KCCQ score associated with changes in the treadmill time (P=0.047).

FC: VO<sub>2</sub>-change was associated with change in 6MWD (p=0.03), ventilatory-derived anaerobic threshold (P<0.001)

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and treadmill time ( $P < 0.001$ ).

Modica et al. 2015

QOL predicted by:

1. Characteristics of device
2. Experience of disease during wait for HTX
3. Nature of device
4. Quality of doctor-patient communication
5. Possibility of experience sharing between implanted patients
6. Psychological character of recipient.

FC: NA

Kiernan et al. 2016

QOL: Nonresponse associated with:

1. History of diabetes
2. Lower mean Pulmonary Artery Pressure
3. HMII Right Ventricular Risk Score  $> 2$ .

FC: Nonresponse associated with:

1. History of Chronic Obstructive Pulmonary Disease
2. History of diabetes

Jung et al. 2016

QOL: See below

FC:

1. ProBNP not associated with pVO<sub>2</sub>
2. Lower QOL correlated with increasing proBNP
3. Increasing pVO<sub>2</sub> and duration of work were associated with better QOL (MLWHF-P), p<5%.

Cowger et al 2018<sup>49</sup> Higher preoperative hemoglobin  
Younger age  
Better baseline QOL and functional capacity

**FC only**

Dimopoulos et al. 2011 Chronotropic incompetence

Jakovljevic et al. 2011 Weak positive association between peak cardiac power output and pVO<sub>2</sub> (P<0.05).

Jacquet et al. 2011

1. Spontaneous increase of pump flow (at constant pump speed)
2. Increase of the native cardiac output contribute to total flow elevation.

Hasin et al. 2012

1. Diabetes mellitus (P=0.003)
2. Elevated 1-month right atrial pressure (p=0.003)

Noor et al 2012 LVEF (P=0.03).

Karapolat et al. 2013 QOL: Improvement in exercise capacity.

FC: Eight weeks of supervised CR increased pVO<sub>2</sub> from BL to FU: P<0.05.

Grosman-Rimon et al. 2013

Chronotropic incompetence (HR<80%).

Study also suggests that exercise capacity in cf-LVADs may be associated with inflammation.

Martina et al. 2013

FC: Lower VO<sub>2</sub> for age>50 than for age<50years: 14.5 ± 3.0 vs 20.0 ± 6.7 ml/kg/min, P<0.01.

Trends: increased blood pressure rise in men during exercise than in women: MAP 102 ± 15 vs 88 ± 12 mmHg, P<0.01.

Camboni et al. 2014

Study suggests: An open aortic valve strategy leads to impaired exercise capacity and haemodynamics.

Imamura et al. 2015

Native aortic valve (AV) opening during exercise at 3 months (although native AV closed during rest) associated with better exercise tolerability compared to patients with closed AV during exercise.

Imamura et al. 2015

Better pVO<sub>2</sub> at 3months association with:

1. Lower readmission rates
2. Persistently normal preoperative serum albumin association with lowest preoperative CRP and better VO<sub>2</sub>
3. Persistently-low perioperative s-albumin associated with highest CRP and worse exercise tolerance at 3 months.

Marko et al. 2015

Exercise training for LVAD patient as part of a multidisciplinary rehabilitation program is effective and safe.

- Kerrigan et al. 2016 %HRR in non-paced LVADs was a good predictor of %VO<sub>2</sub>Reserve.
- Jung et al. 2017 Pump speed +800 rpm
- Fresiello et al. 2016
1. Pump speed +200 rpm (NS)
  2. Suggestion: VAD power may be a useful parameter to monitor patients during exercise.
- Vignati et al. 2017 Increased pump speed leading to increased CO and increased pVO<sub>2</sub>.
- Marko et al. 2017
1. Cardiac rehabilitation program (starting 39 ± 18 days after LVAD implantation) improved 6MWD and pVO<sub>2</sub>.
- Lim et al 2017
1. Heart rate response during exercise
  2. Reduction in right atrial pressure in the first 6months post-implant.
- Lairez et al. 2018 RVEF<40% was associated with lower exercise capacity.
- Apostolo et al. 2018 Short term speed increase from 2 to 3 increased VO<sub>2</sub> during constant workload.
- Schmidt et al. 2018
1. Age
  2. Haemoglobin
  3. Low baseline walking distance led to longer cardiac rehabilitation.
  4. Lower baseline walking distance led to greater increase (greater delta walking distance)
  5. Peak-watt correlated with peak VO<sub>2</sub>.
- Mezzani et al. 2018 Explanatory: LVAD exercise gas exchange is characterised by alveolar wasted ventilation, i.e. hypoperfusion of ventilated alveoli, similar to that of advanced HFrEF patients and related to surrogates of right ventriculo-arterial coupling and circulating effective volume.

- Rosenbaum et al. 2018
1. HMII PI: R=0.48, P=0.003
  2. HMII power: R=-0.4, P=0.009
  3. HMII pump flow-0.4, P=0.008
  4. Pump speed: R-0.32, P=0.04
  5. Peak-HR: R=0.41, P=0.004
- Not positive: LVEF,  $\Delta$ LVEDD, RV function (R=0.22, P=0.28), PAPI, RVSWI, AV opening (P=0.57), septal positioning, AI, MI, RHC, medications at time of CPET, (data not shown).
- Racca et al. 2018
1. 6MWT increment associated with baseline CRP and Albumin.
  2. Suggestion: 6MWT increment may be associated with severely reduced levels of IGF-I (P>5%).
- Cowger et al 2018
1. Patients with severe adverse events showed less improvements in 6MWT increment than those without severe adverse events.
- Schmidt et al. 2019
1. Negative linear correlation between weight gain post implantation (P < 0.05).
- Gross et al. 2019
1. Peak workload (P=0.0002)
  2. Chronotropic response (P=0.001)
  3. Aortic valve opening (P=0.02)
  4. Age (P=0.006).
- Koshy et al. 2019
- VAD group only: Resting pulmonary arterial wedge and pulmonary arterial mean pressures were independently related to pVO<sub>2</sub> (both P < 0.05).

Mirza et al. 2020 Chronotropic incompetence was associated with lower exercise capacity (pVO<sub>2</sub>).

Gustafsson and 1. Atrial fibrillation

Mirza et al [ahead of 2. Age

print] 2020 3. New York Heart Association IV

4. INTERMACS profile 1–2.

Mirza et al. 2020 RVEF did not predict VO<sub>2</sub>.

6MWT: 6-minute walk test

6MWTD/6MWD: 6-minute walk test distance

LVEF: Left ventricular ejection fraction

RVEF: Right ventricular ejection fraction

VAD: Ventricular assist device

CR: Cardiac rehabilitation