Third generation continuous flow left ventricular assist devices; a comparative outcome analysis by device type

M. Mihalj[1], P.P. Heinisch[1], P. Schober[2], S. Dobner[3], M. Fuerholz[3], M. Martinelli[3], B. Hugi-Mayr[1], T.M.M.H. De By[4], P. Mohacsi[3], J.C. Schefold[5], M.M. Luedi[6], A. Kadner[1], T. Carrel[1], L. Hunziker[3], D. Reineke[1]

[1]Bern University Hospital, Inselspital, Department of Cardiovascular Surgery, Bern, Switzerland; [2]Vrije Universiteit Medical Center (VUMC), Department of Anaesthesiology, Amsterdam, Netherlands (The); [3]Bern University Hospital, Inselspital, Department of Cardiology, Bern, Switzerland; [4]EACTS, EUROMACS, Windsor, United Kingdom; [5]Bern University Hospital, Inselspital, Department of Intensive Care Medicine, Bern, Switzerland; [6]Bern University Hospital, Inselspital, Department of Anesthesiology and Pain Medicine, Bern, Switzerland

On behalf of LVAD Unit University Hospital Bern

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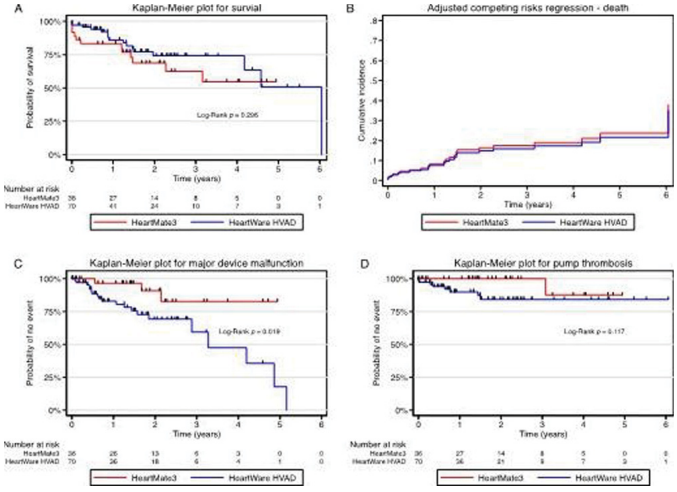
Background: Continuous-flow left ventricular assist devices (CF-LVADs) have become a standard of care in end-stage heart failure (HF). Device-related complications remain high. Limited data exists comparing outcomes of the HeartMate 3 (HM3) and the HeartWare HVAD (HW). We aimed to analyze HM3 and HW devices implanted over the past 10 years with a focus on long-term clinical outcomes of respective patients.

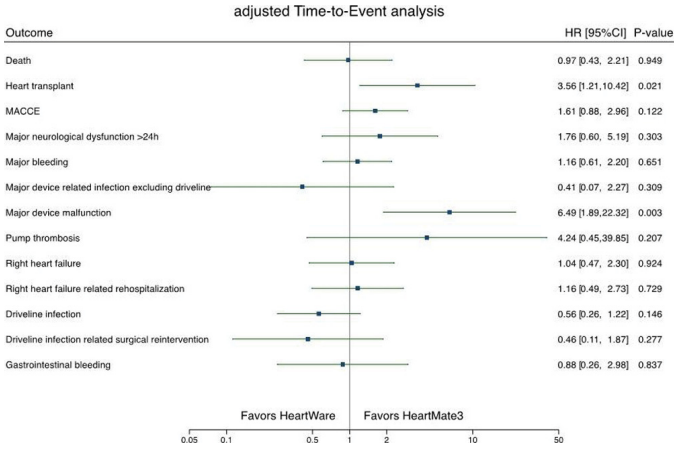
Methods: Investigator-initiated comparative, retrospective observational analysis of all patients who underwent primary implantation of a centrifugal CF-LVAD at our tertiary care academic center between January 2010 and December 2020. Data derived from a prospective registry, and included all patients receiving a HM3 or HW device. Primary endpoint was overall (all-cause) mortality and heart transplantation. Secondary endpoints included device-related major adverse cardiac and cerebrovascular events (MACCE), as well right heart failure (RHF), gastrointestinal (GI) bleeding, driveline infections, and surgical re-interventions.

Results: Out of 106 primary CF-LVAD implantations, 36 (34%) received HM3 and 70 (66%) received HW. Median follow-up time was 1.48 years [interquartile range 0.67, 2.41] and did not differ between devices (p=0.739). HM3 was more often implanted in men (91.7% vs. 72.9%, p=0.024), patients were older (median 61 years [54, 66.5] vs. 52.5 years [43, 60], p<0.001), had a higher body mass index (BMI) (median 26.7 kg/m^2 [23.4, 29.0] vs. 24.3 kg/m^2 [20.7, 27.4], p=0.013), had more comorbidities and were more likely targeted for destination therapy (DT) (36.1% vs. 14.3%, p=0.010). Death occurred in 33.3% of HM3 patients, compared to 22.9% of HW patients, p=0.247 (probability of survival at 2 years 54.7% vs. 74.1%, p=0.296). After adjustment for confounders, we observed a significant 6-fold risk increase in device malfunctions for HW (hazard ratio (HR) 6.49, 95% CI [1.89, 22.32], p=0.003), but no significant differences between devices in pump thrombosis (p=0.173) or overall survival (p=0.801).

Conclusions: Comparing long-term outcomes between HeartMate 3 and HeartWare HVAD for LVAD support from a prospective registry, HeartWare HVAD patients had a significantly higher risk of device malfunctions. No significant differences were evident between devices in overall survival, and in respect to most clinical outcomes.



KM Plot primary and secondary outcomes



Risk analysis on all outcomes