

Continuous Inter-Atrial Shunting: Latest Clinical Insights

Daniel Burkhoff MD PhD

Director CHF, Hemodynamics and MCS Research

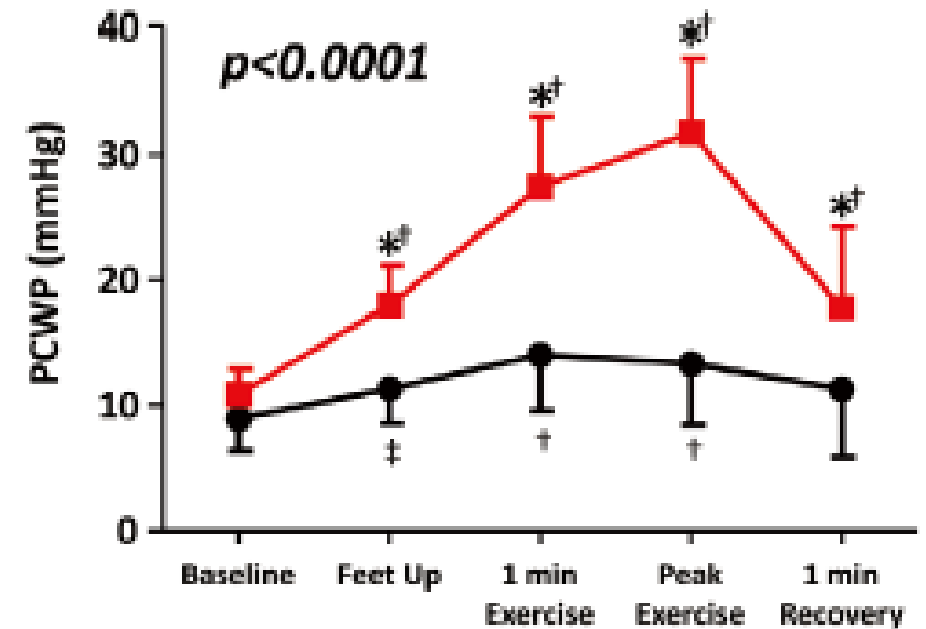
Cardiovascular Research Foundation

Disclosures

Consulting fees from Corvia Medical for Hemodynamic Core Lab

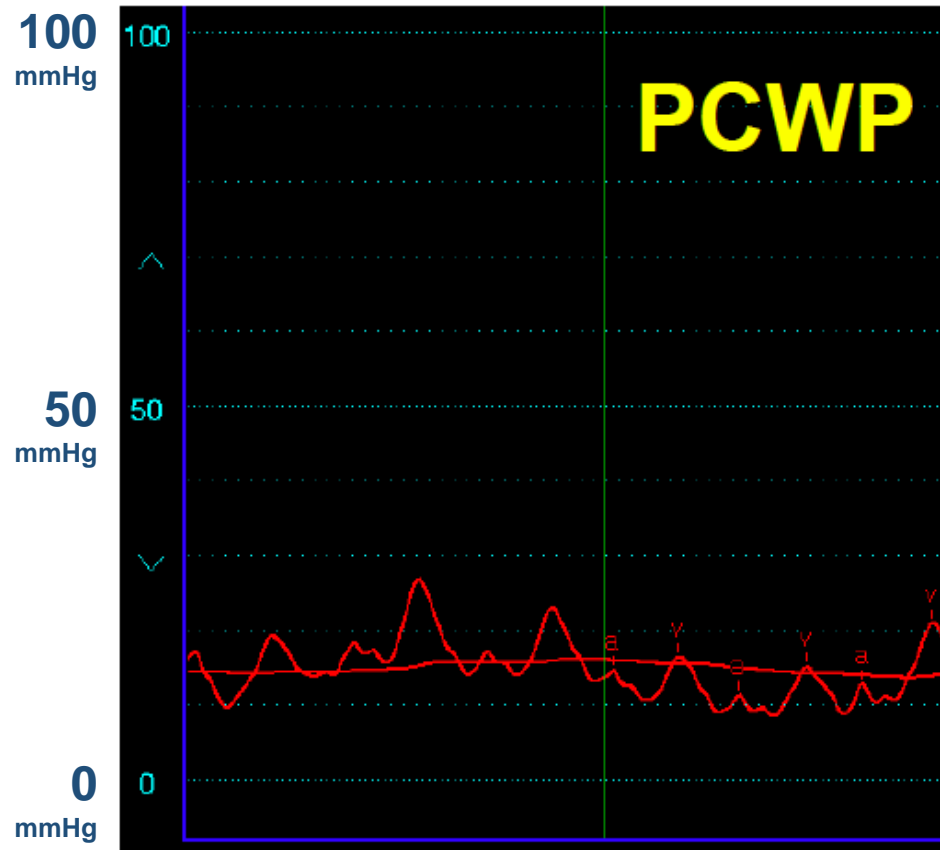
IASD: Rationale

- HFpEF (LVEF > 50%) and HFmrEF (LVEF 40-50%):
 - Increasing in prevalence
 - High morbidity/mortality
 - No proven therapies
 - Heterogeneous syndromes
 - Common pathophysiologic thread: \uparrow LA pressure at rest or with exertion

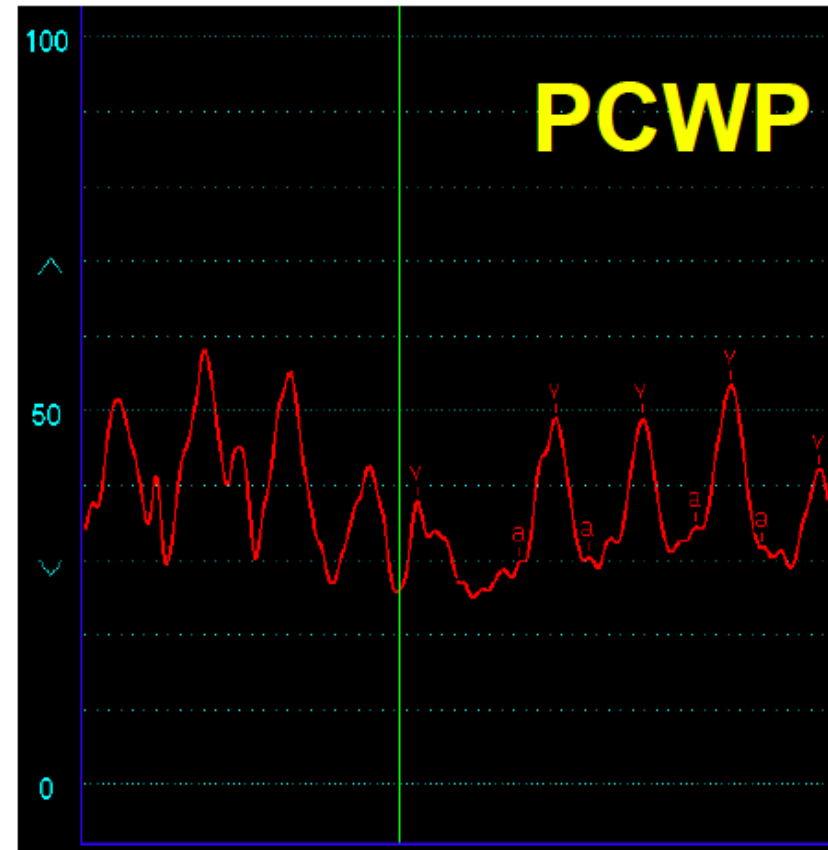


Borlaug et al. Circ. Journal 2013

Exercise hemodynamics in HFpEF

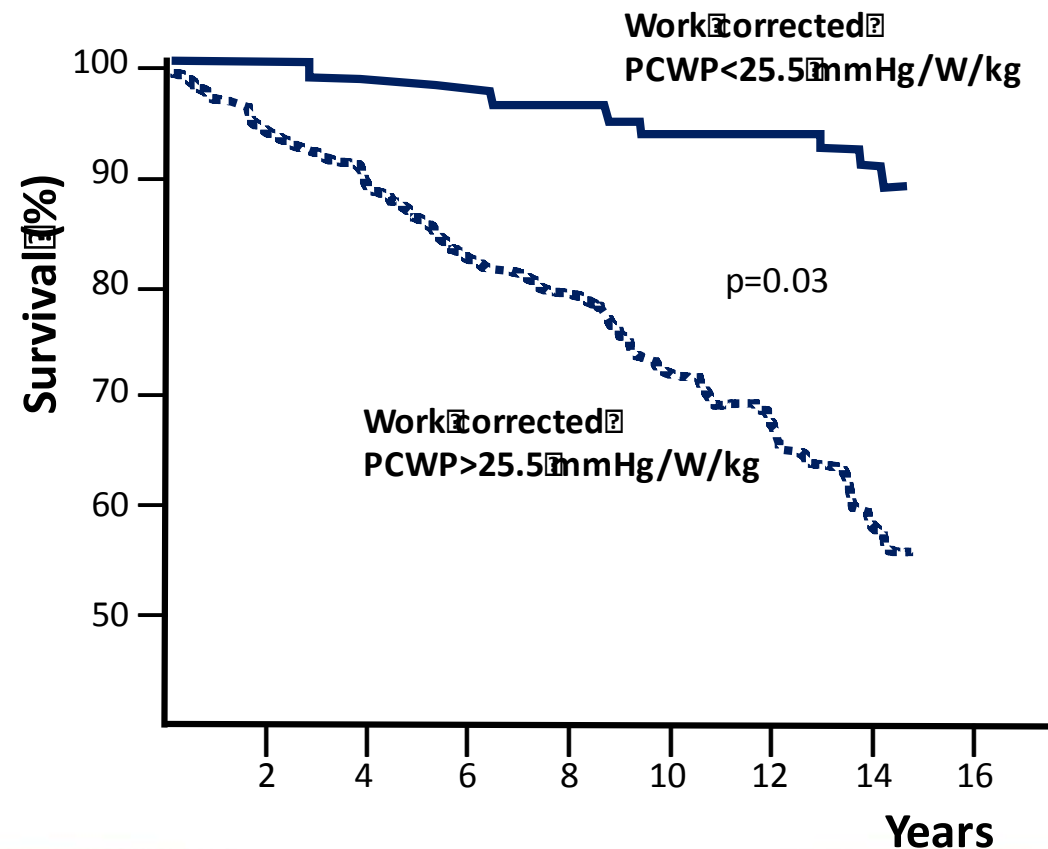


At REST



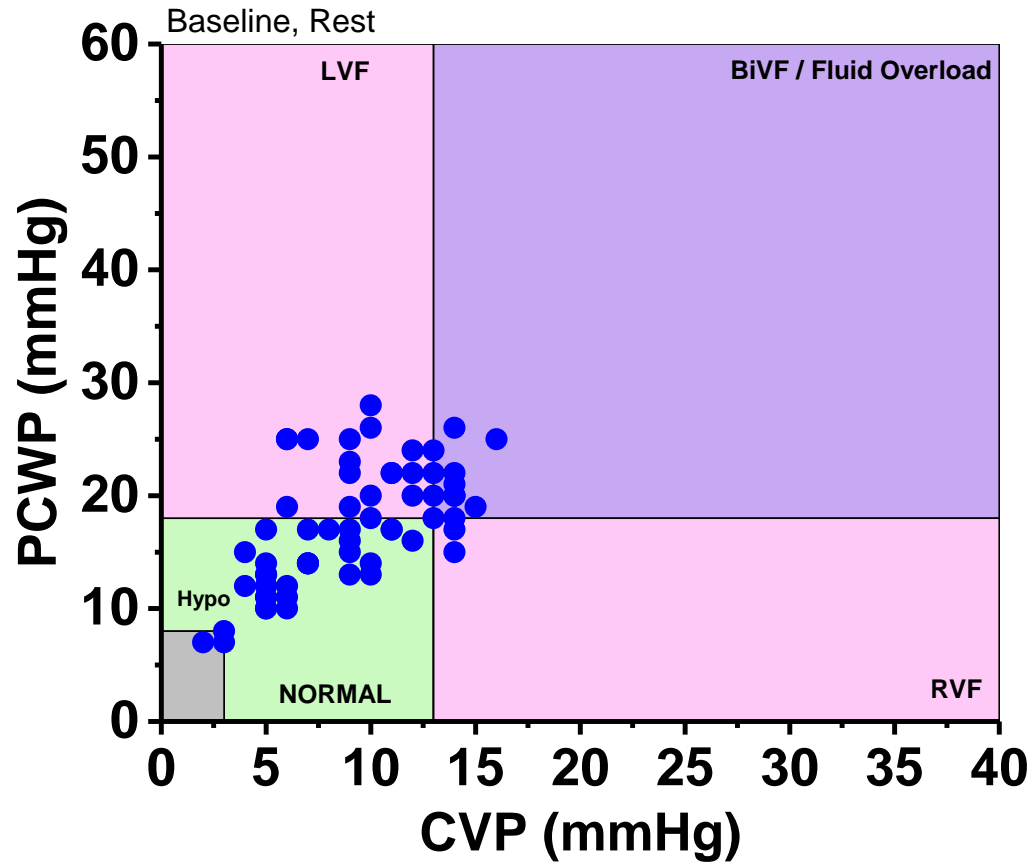
AFTER 1 MIN. OF EXERCISE

Importance of Exercise-Induced ↑LA pressure in HFpEF

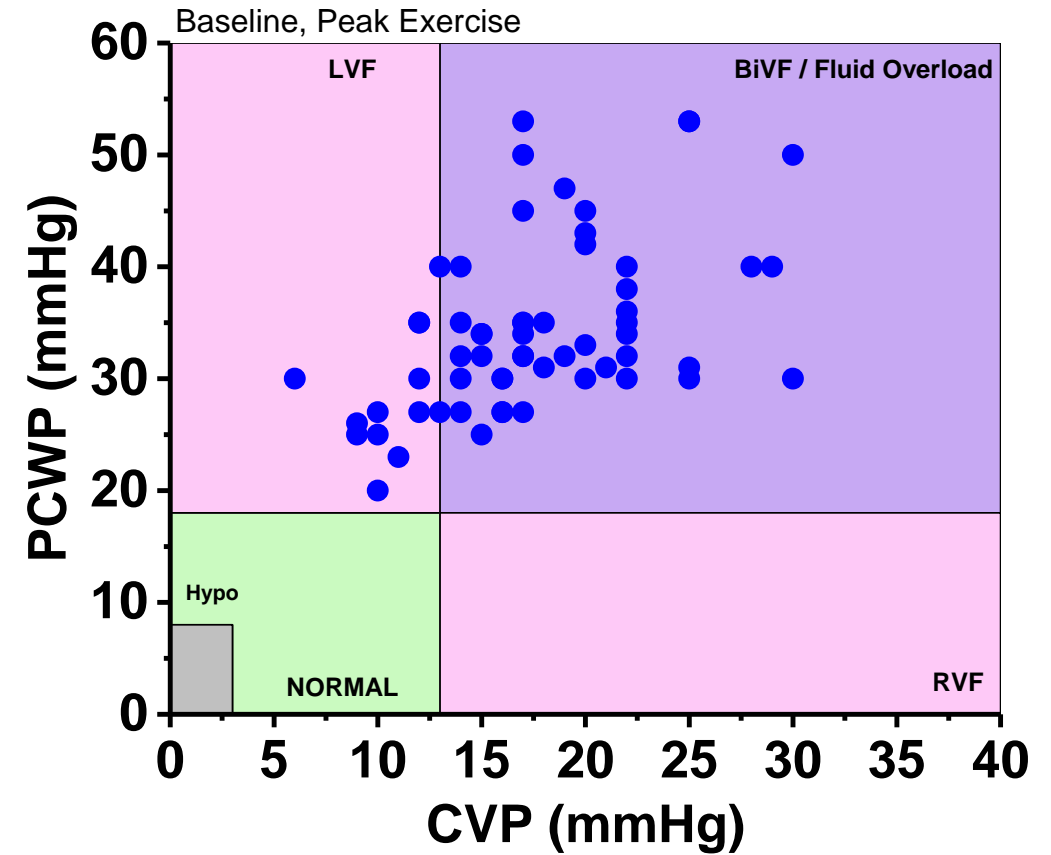


Both CVP and PCWP Increase with Exercise in HFpEF/HFmrEF

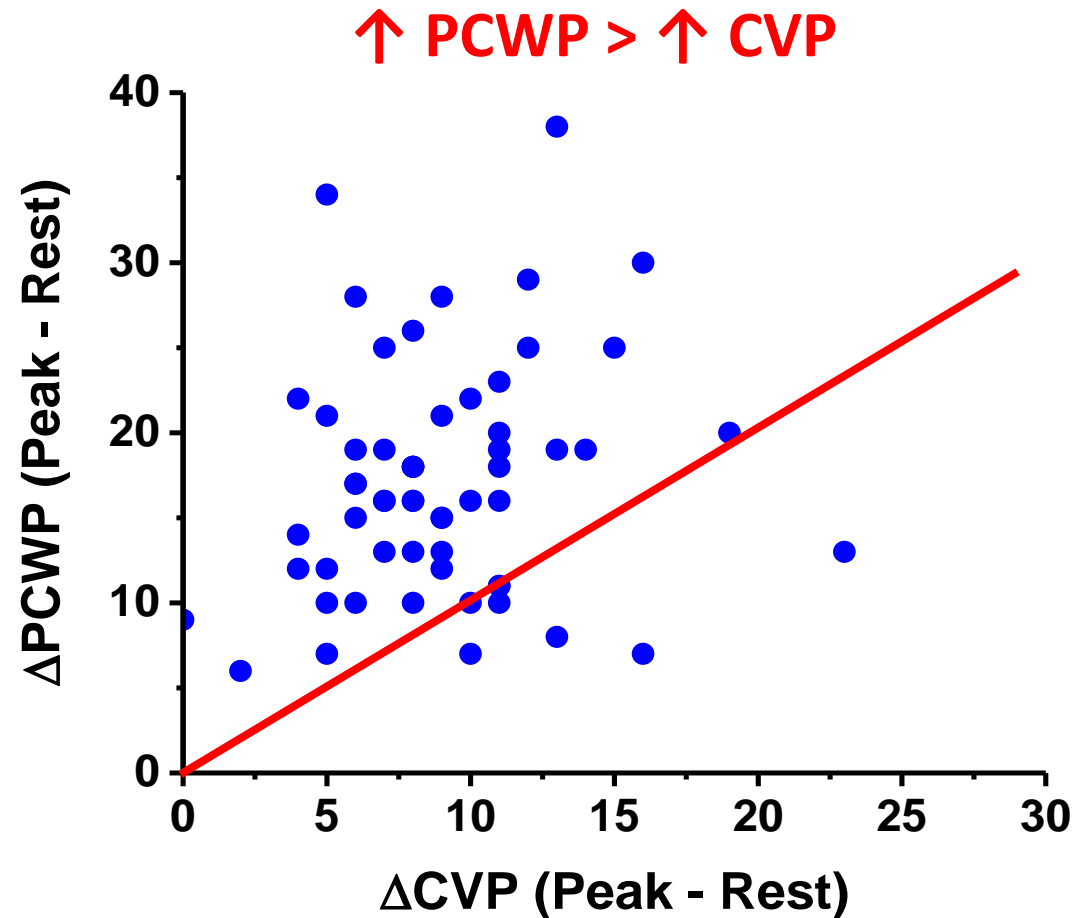
REST



EXERCISE



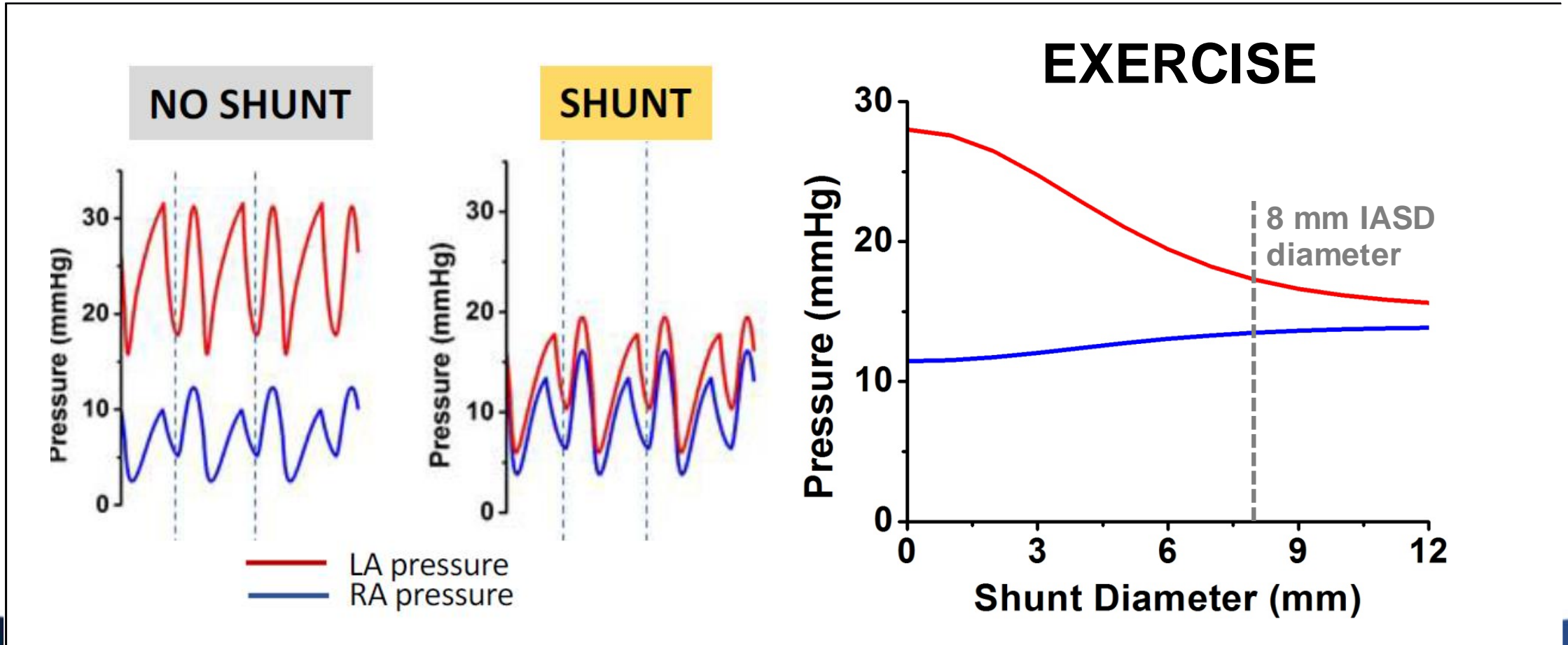
Exercise induced PCWP increase is greater than CVP increase



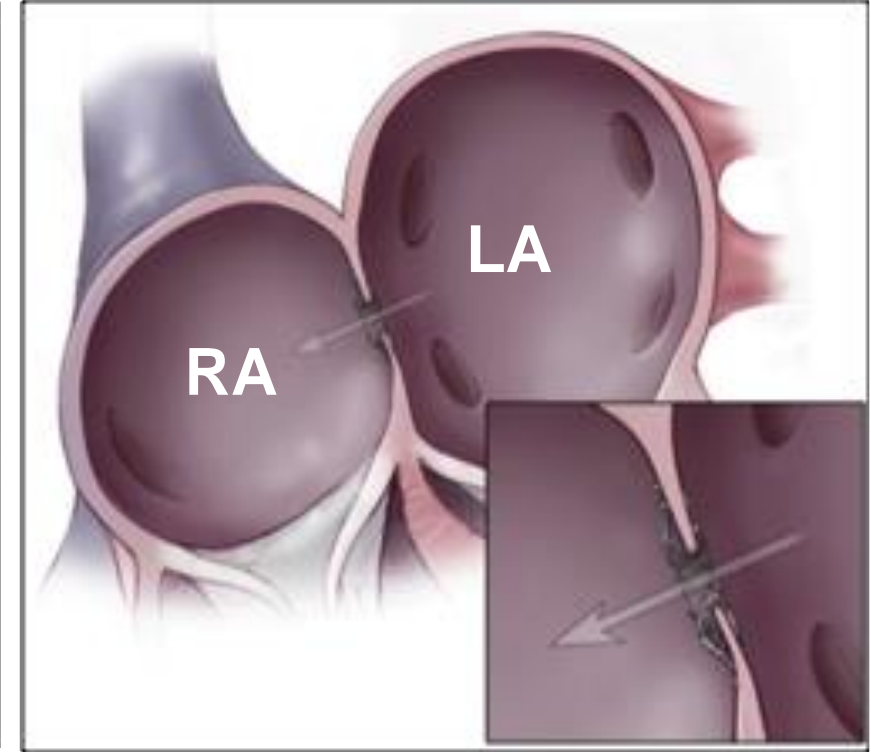
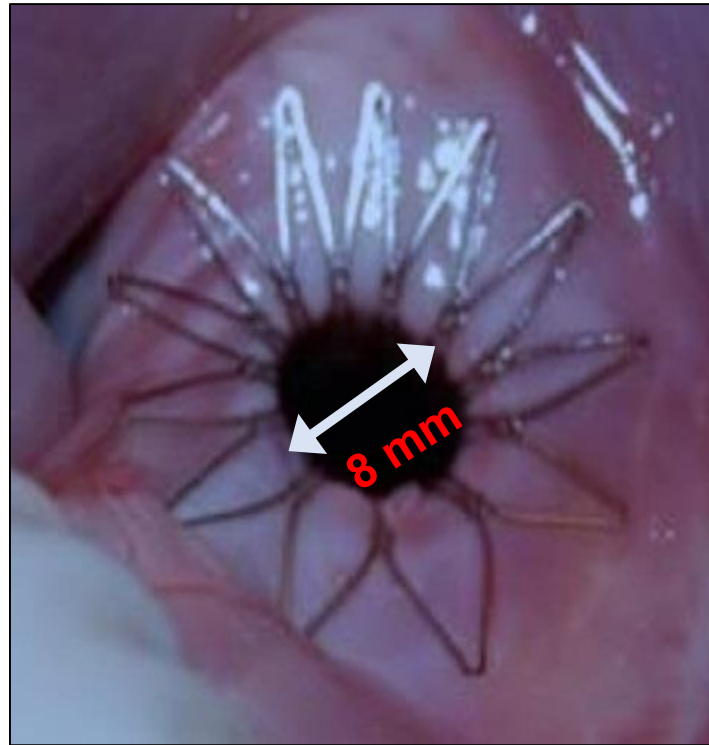
The LA-RA gradient is the driving pressure for atrial decompression

InterAtrial Shunt Device

Simulation using exercise hemodynamic data from HFpEF patients

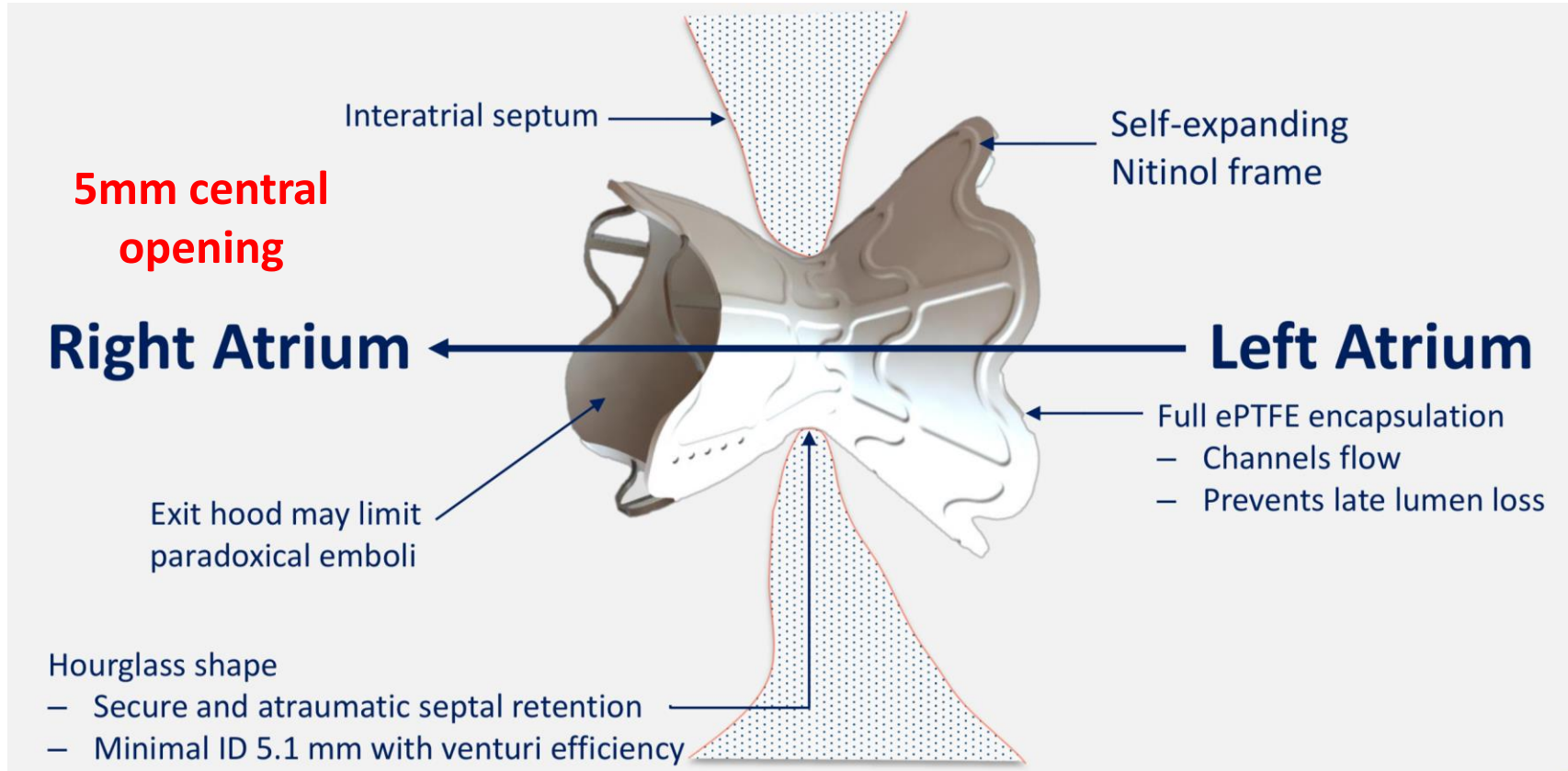


Interatrial shunt for passive LA decompression



Corvia Medical IASD

Interatrial shunt for passive LA decompression



VWave

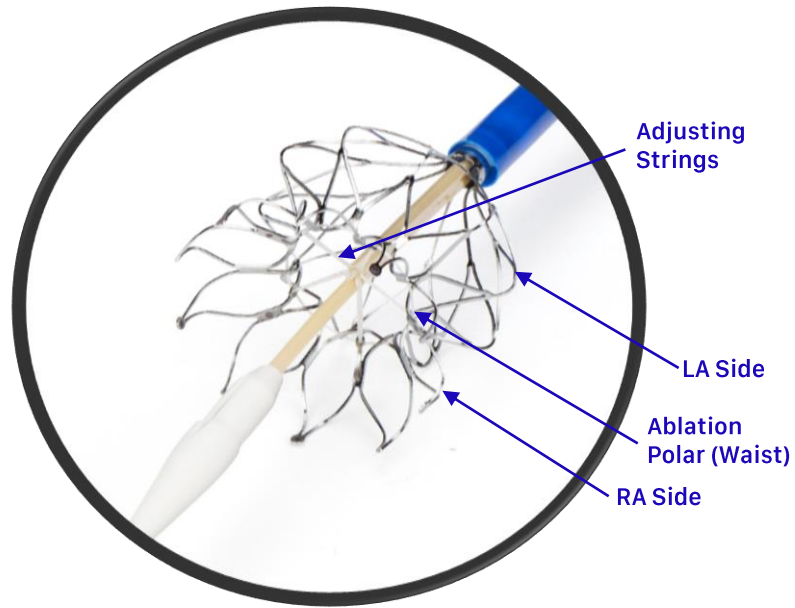
Interatrial shunt for passive LA decompression



Occlutech

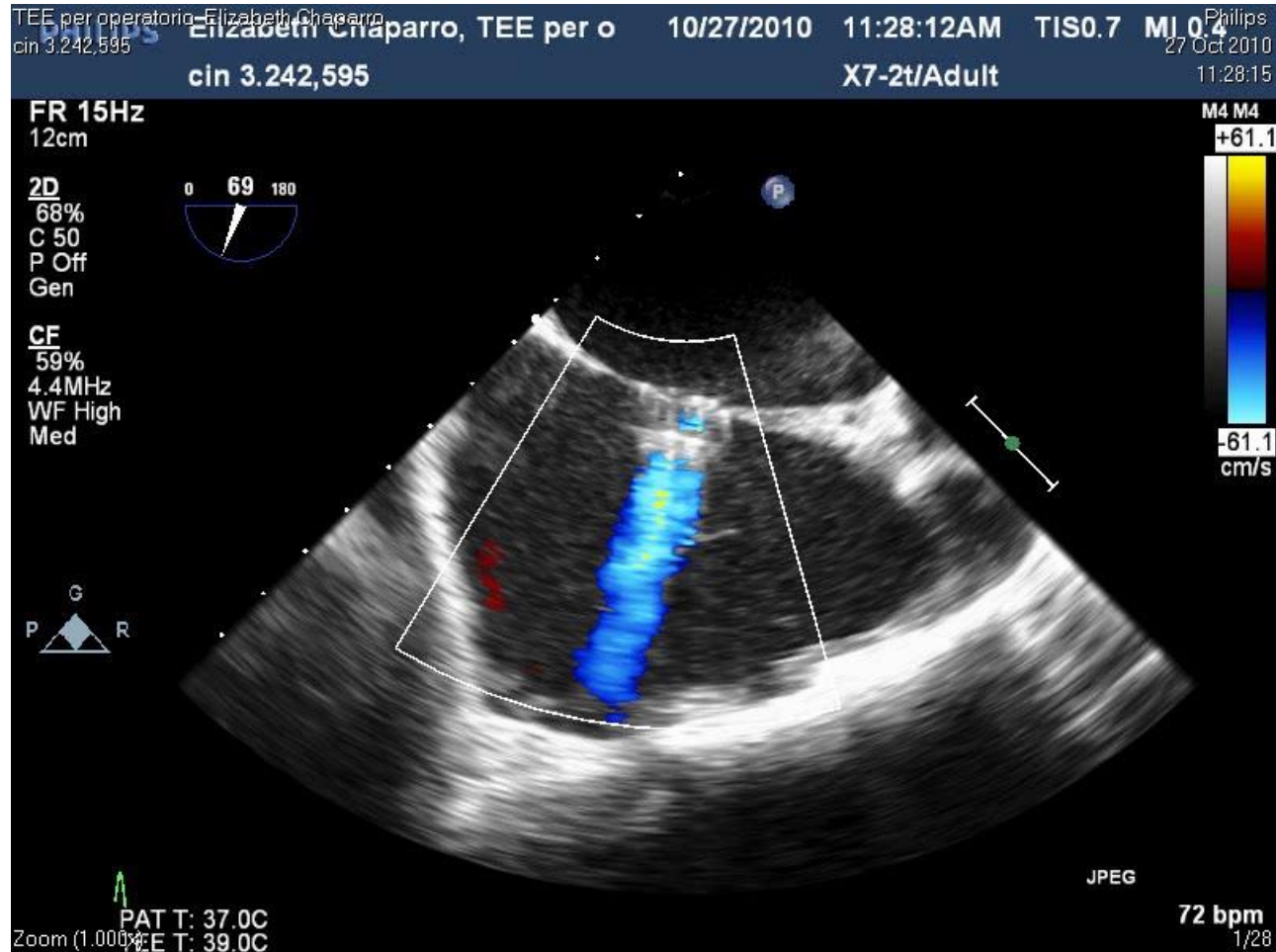


Interatrial shunt for passive LA decompression



Corvia Implant

Continuous L→R Flow

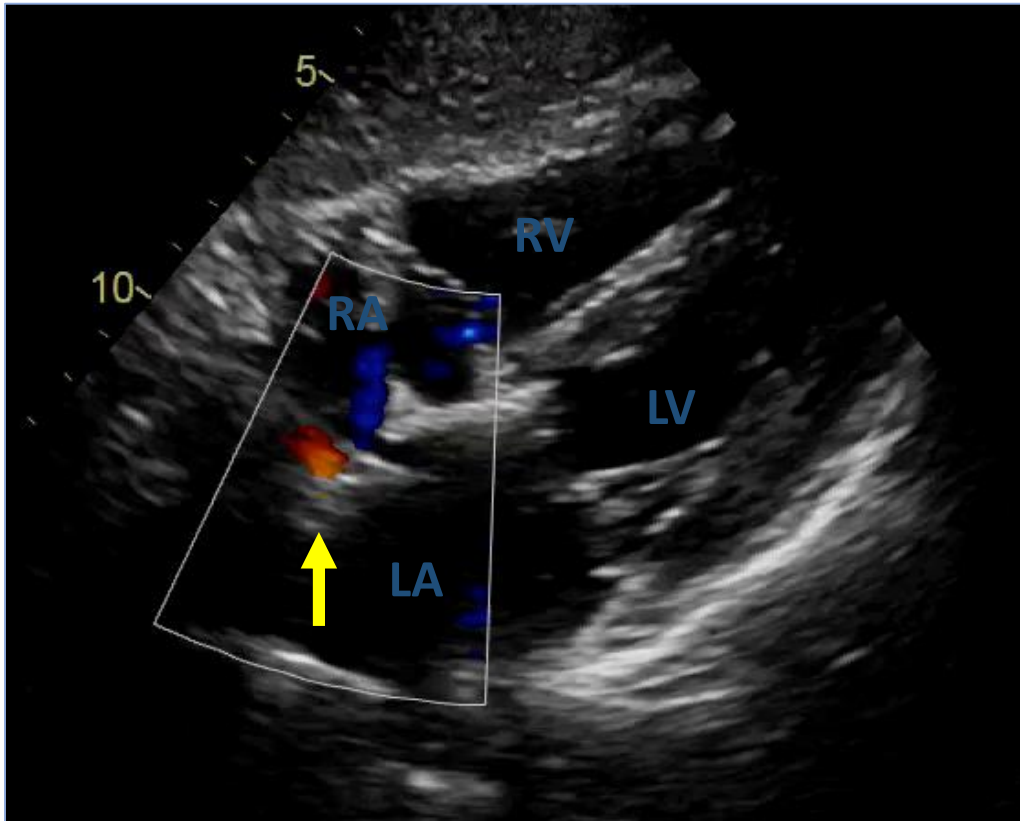


45 Days after implant

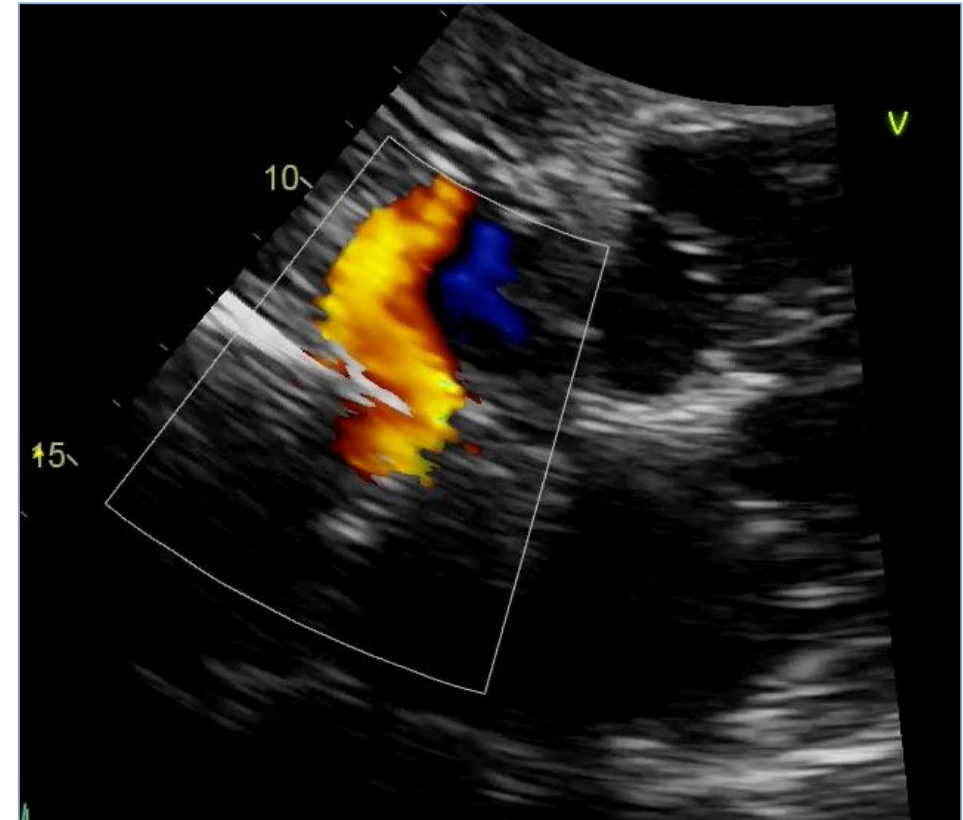
Corvia Implant

Continuous L→R Flow

Subcostal view



Subcostal view (zoomed)



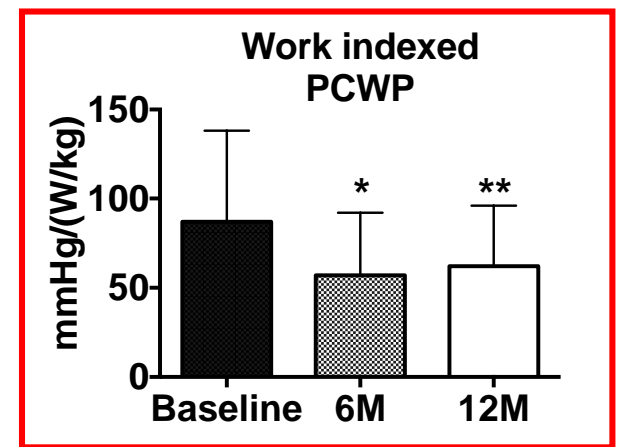
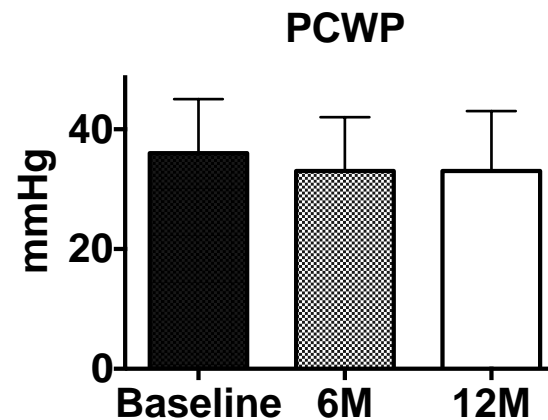
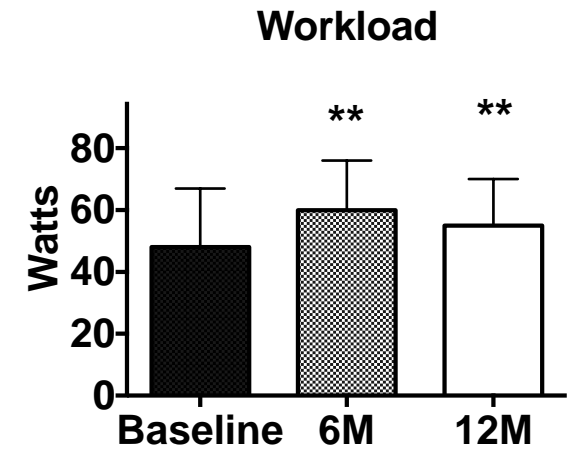
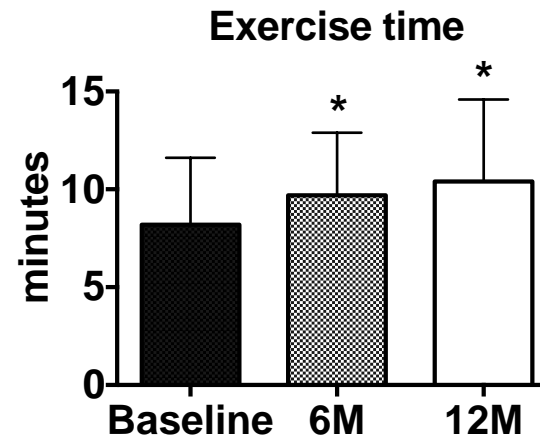
12-month echo

Results of IASD Open-Label Study (n=64)

Inclusion criteria:

- Open label
- LVEF $\geq 40\%$,
- NYHA class II-IV
- Elevated PCWP
 - ≥ 15 mmHg (rest) or
 - ≥ 25 mmHg (supine bicycle exercise)

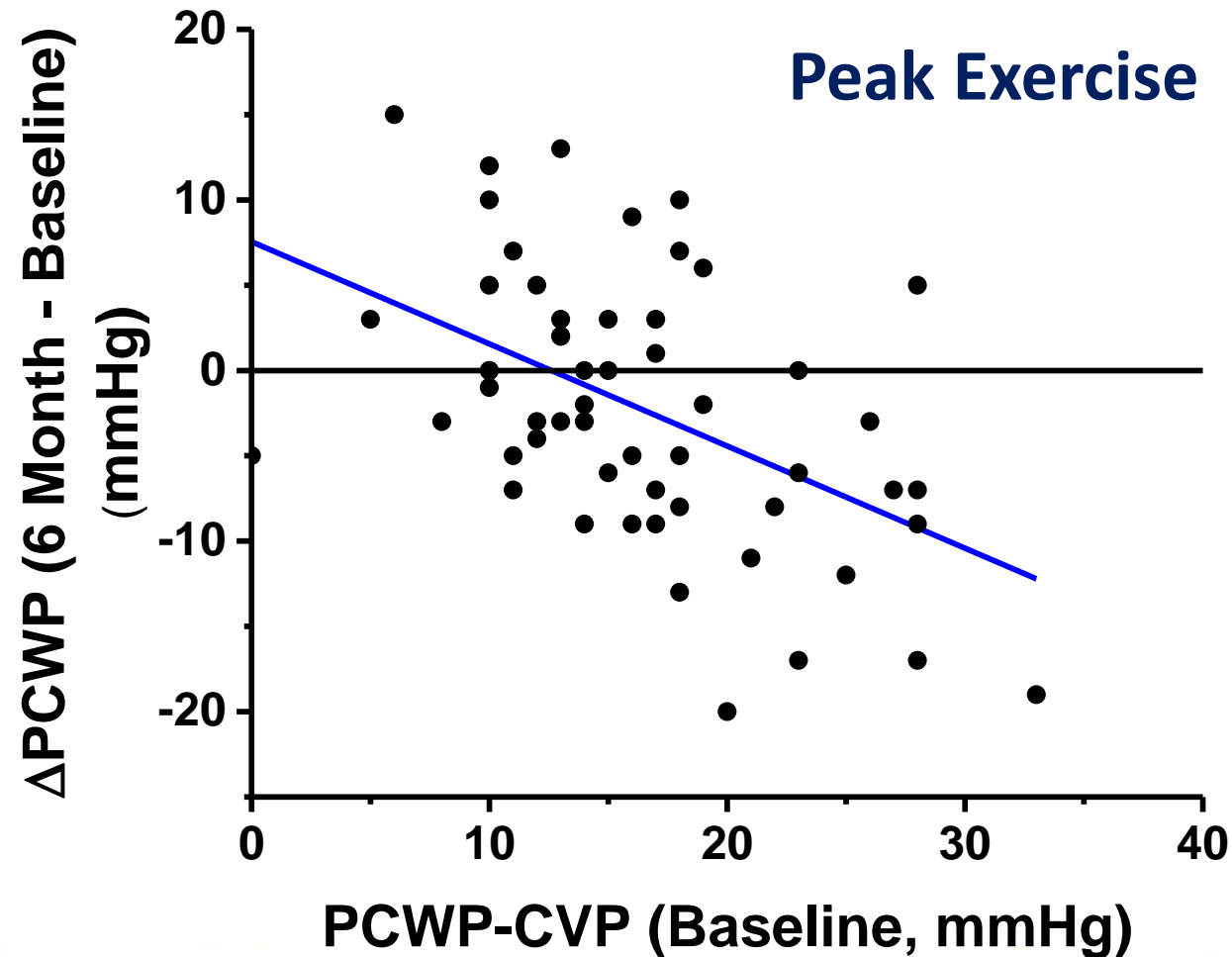
Acceptable safety profile at
12, 24 months



*p<0.05, **p<0.01 vs. baseline

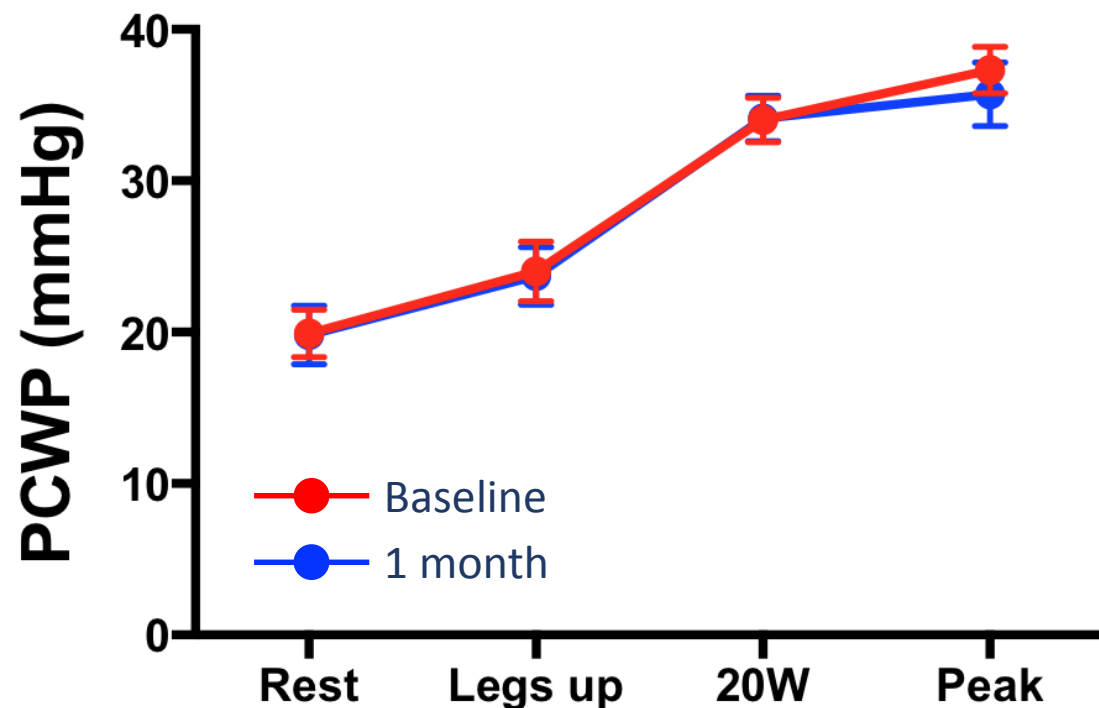
Hasenfuß G...Kaye D. *Lancet* 2016
Kaye D, et al. *Circ Heart Fail* 2016

Baseline PCWP-CVP Pressure Gradient Correlates with Decrease in PCWP at 6 Months

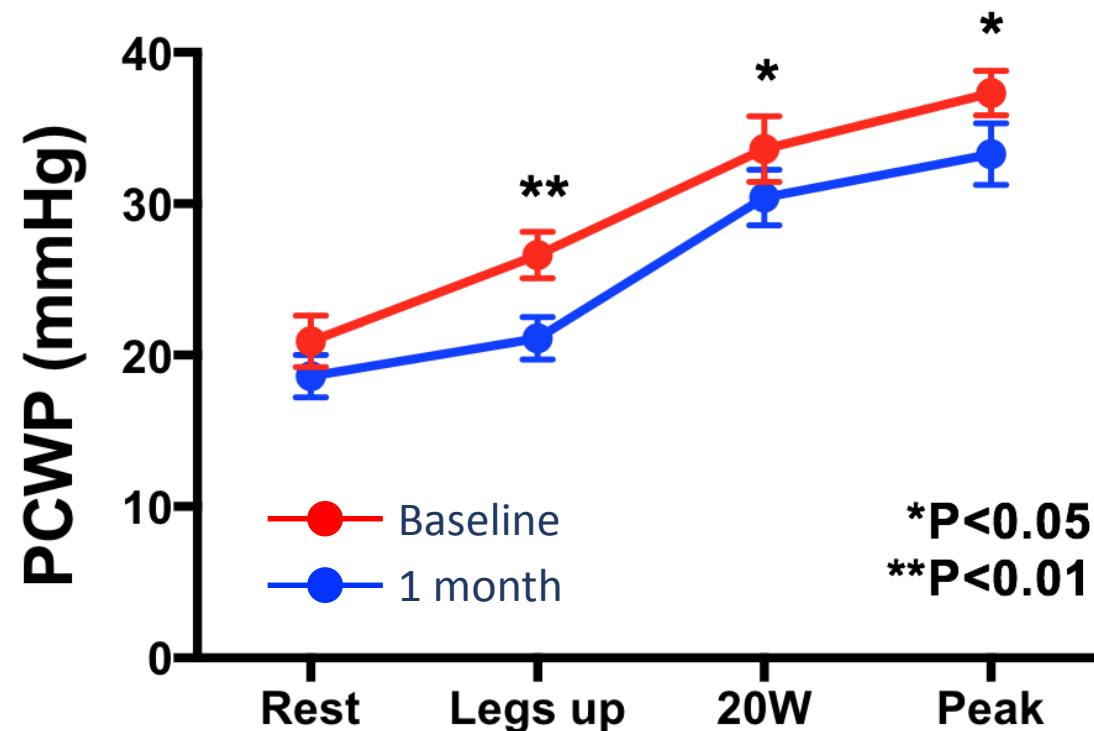


REDUCE LAP-HF I RCT: Results

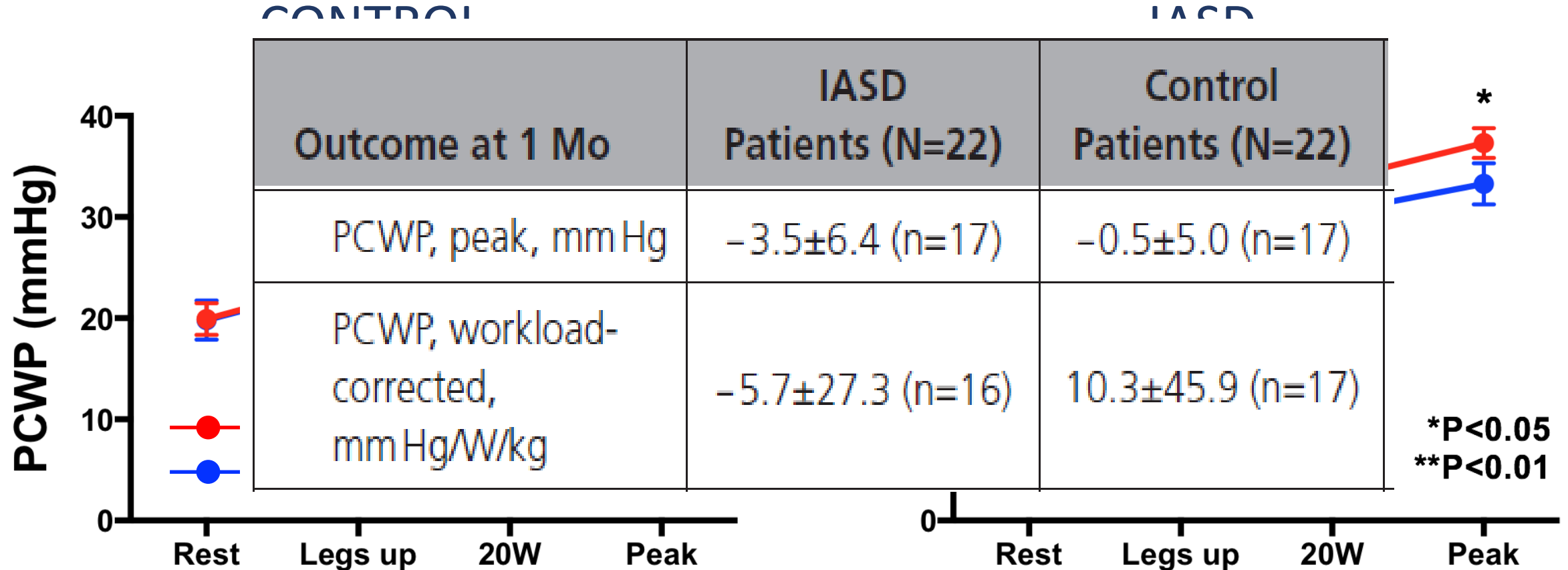
CONTROL



IASD

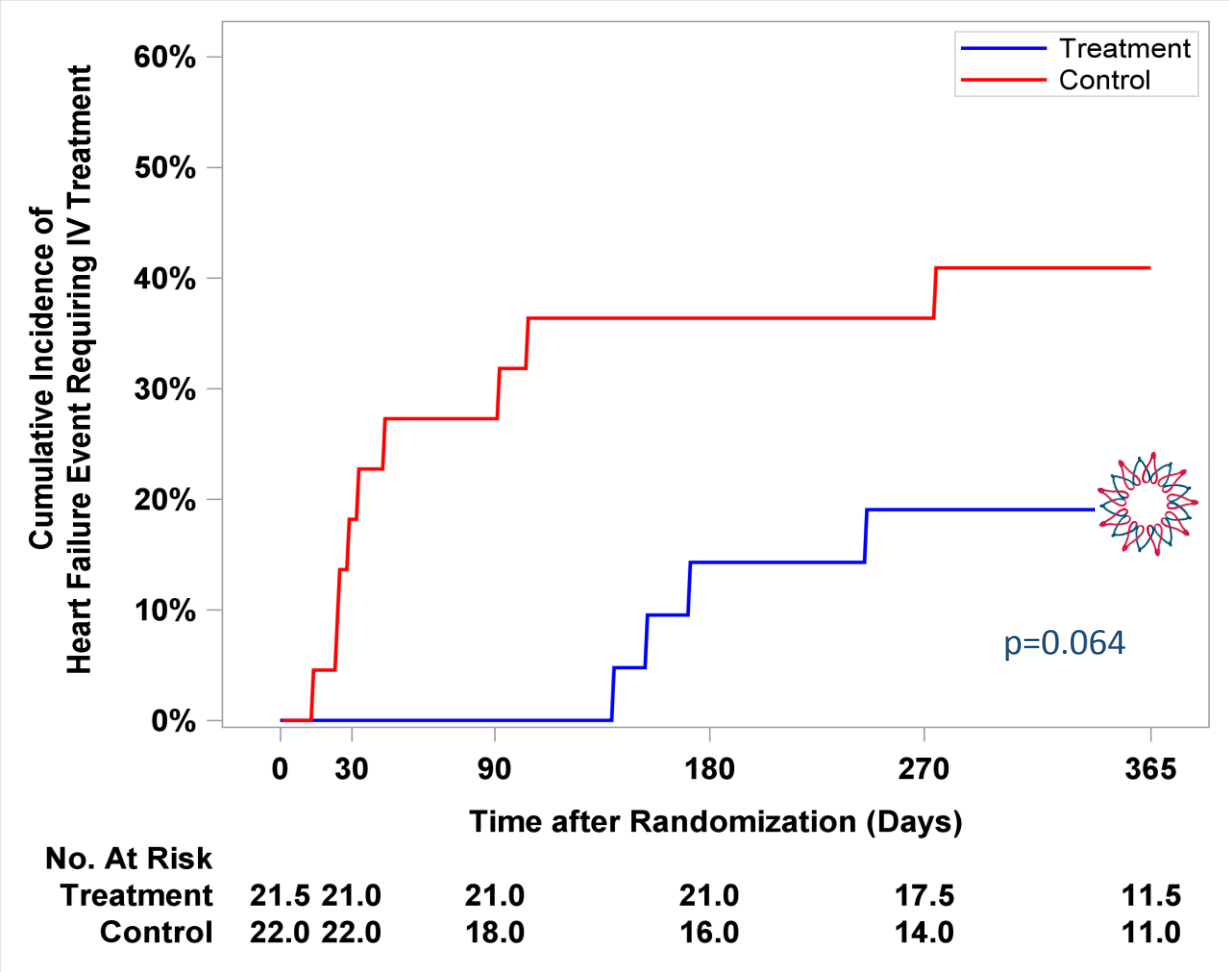
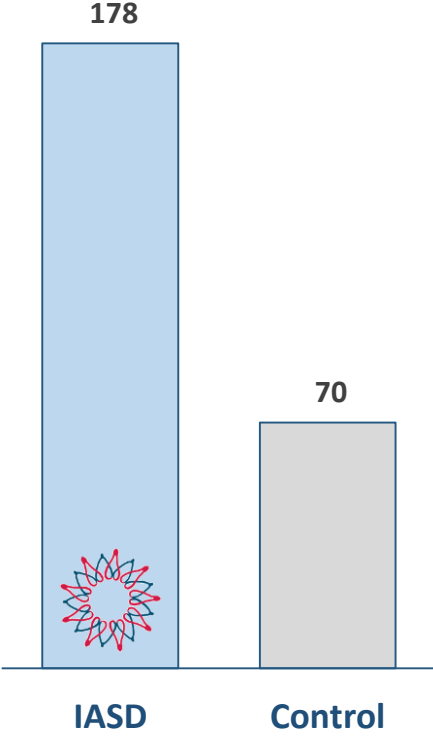


ΔPCWP: Baseline vs 1 Month



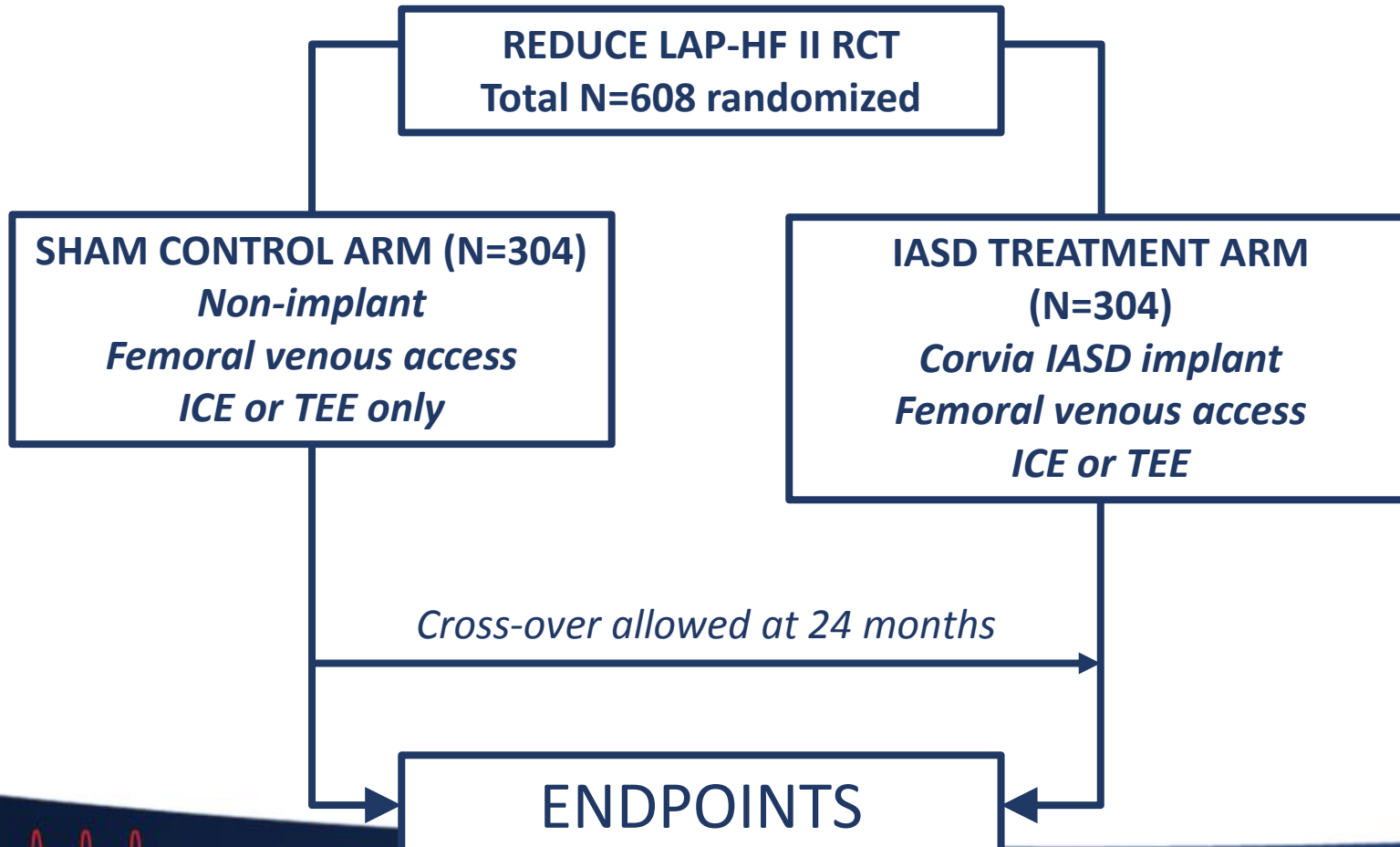
IASD Treatment Reduced Incidence and Delayed Time to 1st IV Diuresis

108 More Days until
1st IV Diuresis Event



REDUCE LAP-HF II Pivotal RCT

PROSPECTIVE, MULTICENTER, 1:1 RANDOMIZED, SHAM-CONTROLLED, BLINDED TRIAL



- Rigorous non-invasive and invasive exercise hemodynamic screening
- Primary endpoint (12 mo.):
 - CV mortality
 - Non-fatal ischemic stroke
 - Rate of total HF hospitalizations
 - KCCQ
- Powered secondary endpoints:
 - Change in NYHA class
 - Change in KCCQ

REDUCE LAP-HF II

Key Inclusion Criteria and Execution

- Site reported EF $\geq 40\%$
- Invasive (exercise) HF diagnosis
 - Exercise PCWP > 25 mm Hg
 - PCWP-RA gradient
- Sham control procedure
- Double blinding for 2 years
 - Patient
 - Managing HF MD

Summary

- Rapid and profound rise in PCWP with exertion in heart failure, particularly HFpEF and HFmrEF
- Persistent and significant Left-to-Right atrial pressure gradient on exertion
- Exercise hemodynamic are important for optimal patient selection
- IASD decreases PCWP while prolonging exercise time and peak Watts
- Preliminary results show symptomatic improvement and decrease in rate of HF decompensation