2018 euroPCR

Left atrial decompression in chronic heart failure: why, when, and to what extent?

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EAPCI PCR

Potential conflicts of interest

Speaker's name : Daniel, Burkhoff, New York

☑ I have the following potential conflicts of interest to report:

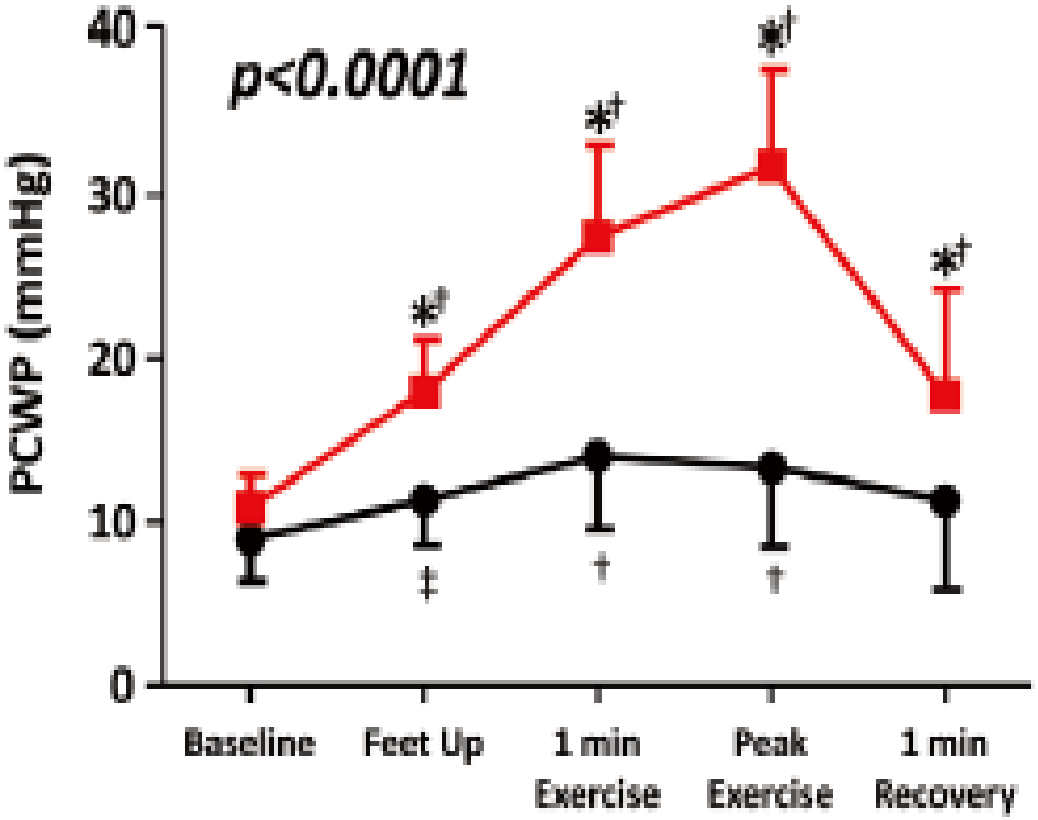
Participation in a company sponsored speaker's buro:

Zoll Medical Corporation

Receipt of grants / research supports:

Abiomed, Corvia Medical

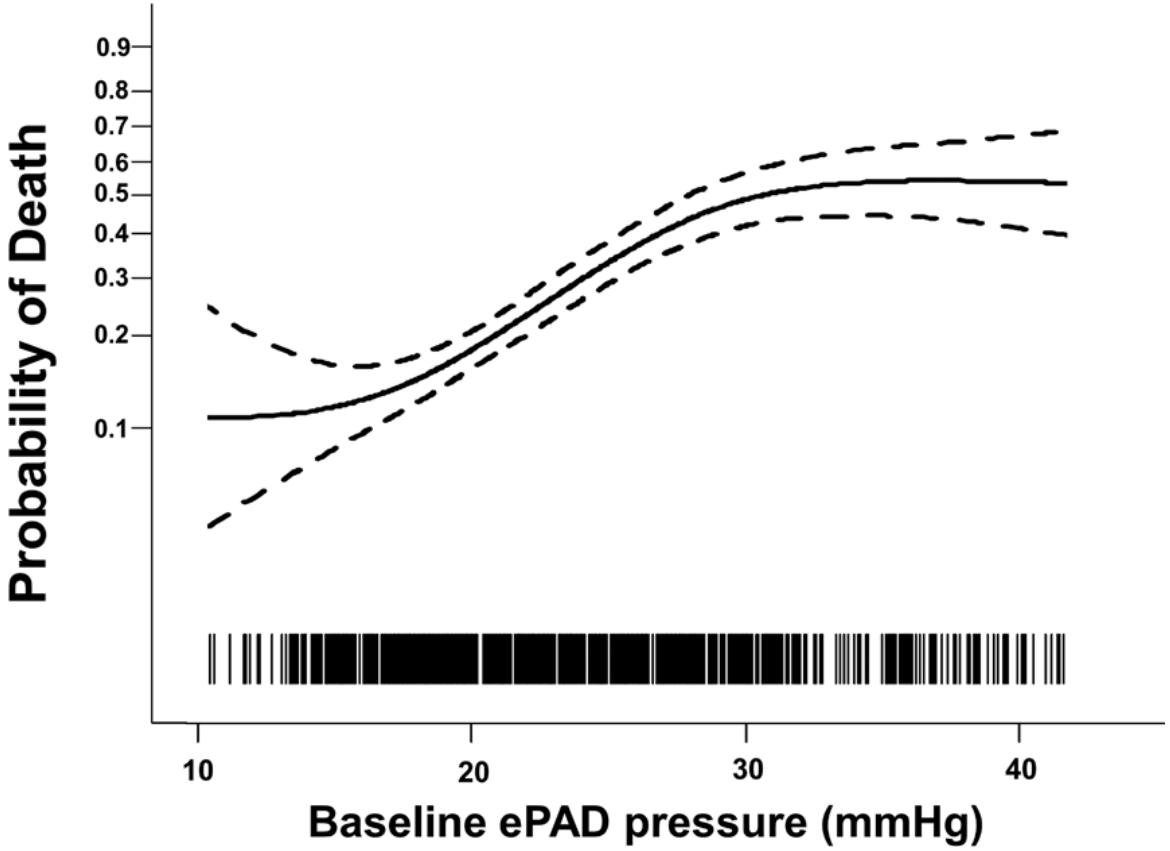
LA Decompression for CHF: **WHY?**



Borlaug et al. Circ Journal 2013

LA Decompression for CHF: WHY?

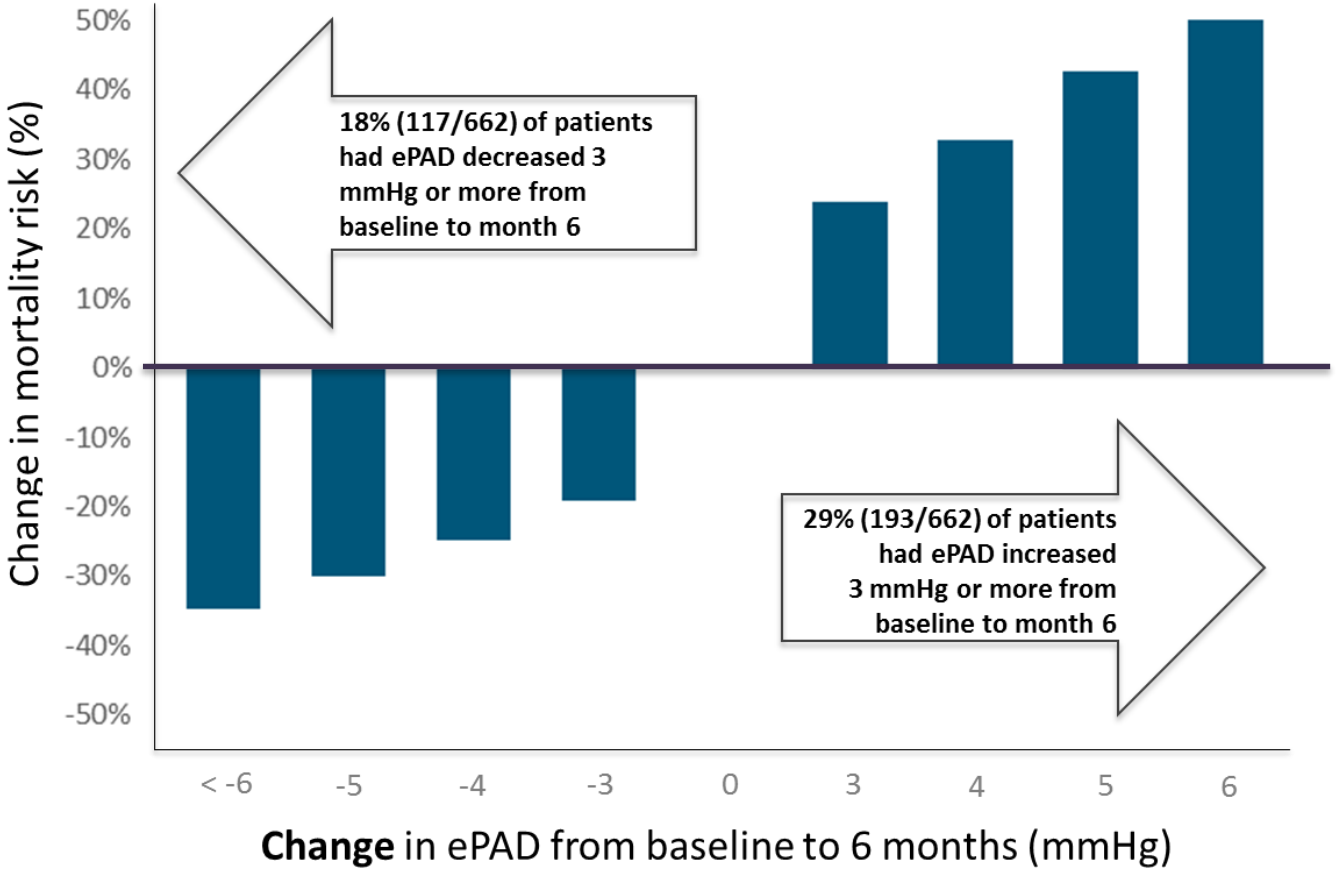
Over a range of ePAD* (≈15–35mm Hg), baseline pressure is directly related to probability of mortality.



Zile et al. Circ. Heart Fail, 2017

LA Decompression for CHF: WHY?

Mortality decreased with relatively small reductions in ePAD

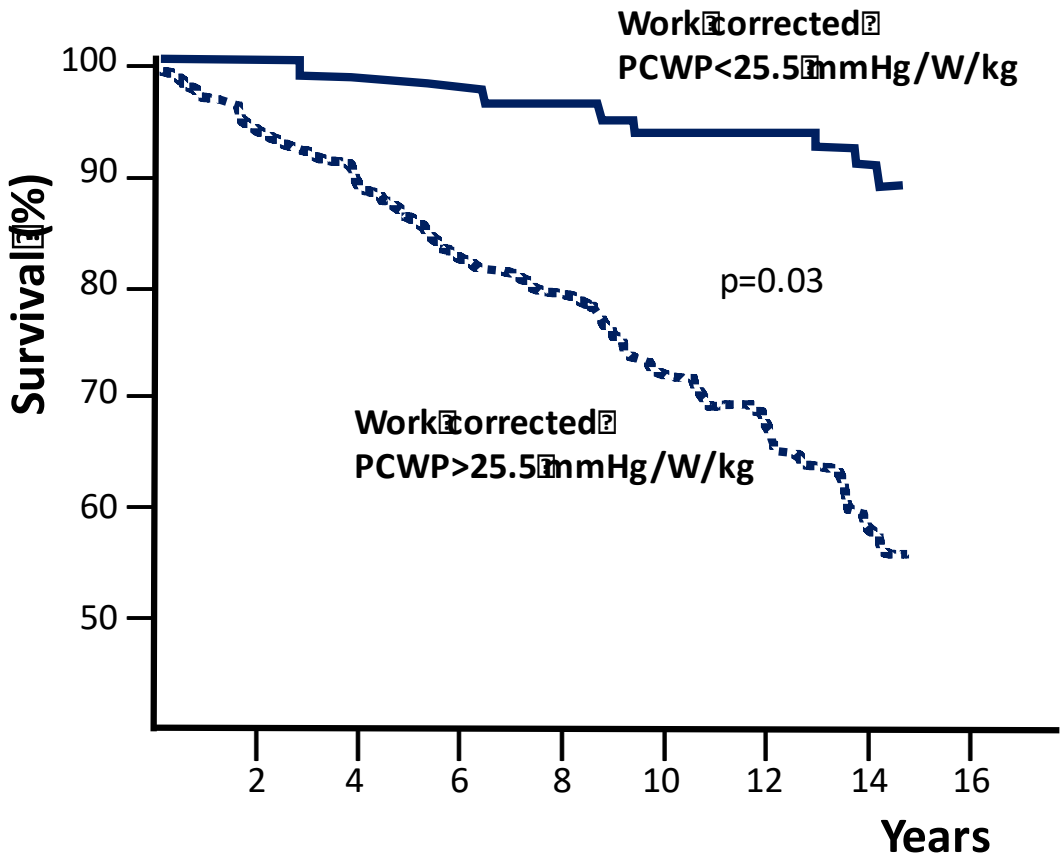


Zile et al. Circ. Heart Fail. 2017

* Estimated Pulm. Art. Diast. Pr.

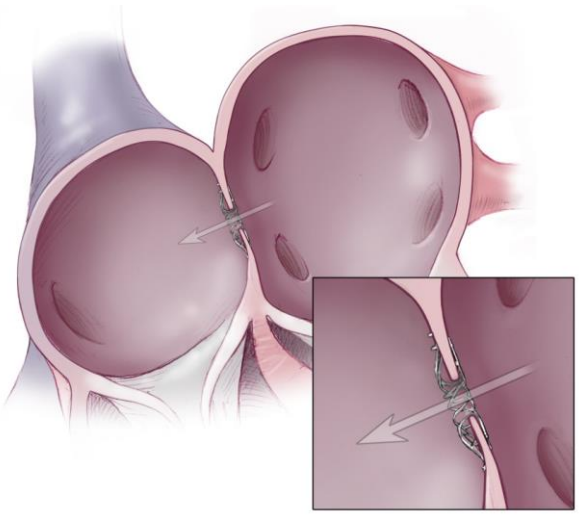
LA Decompression for CHF: **WHY?**

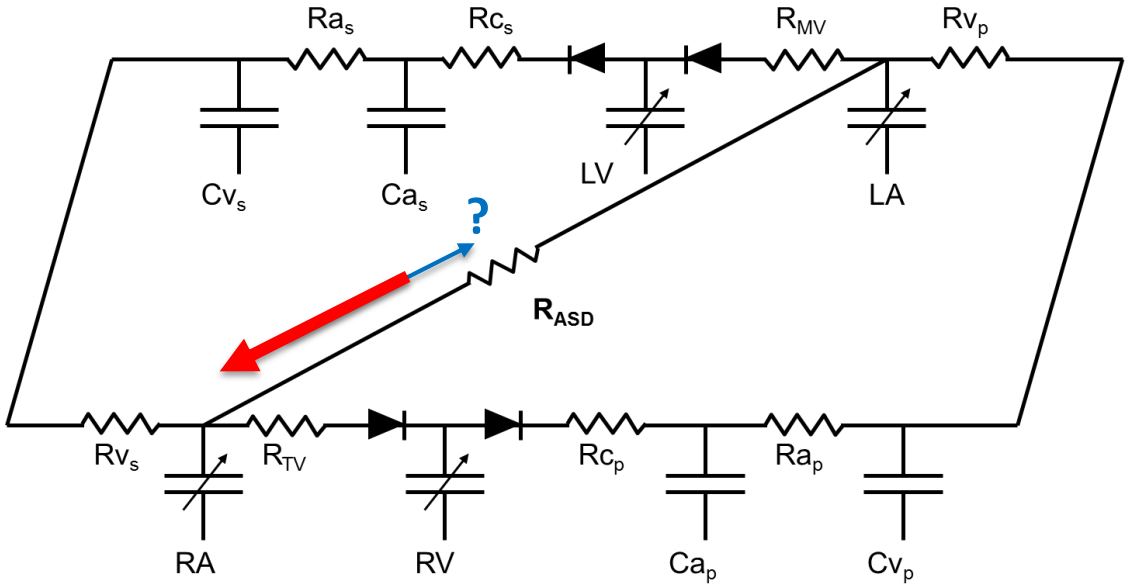
Work-Corrected PCWP Relates to Mortality



Dorfs et al. EHJ.,2014

Interatrial Shunt Device: Theoretical Considerations



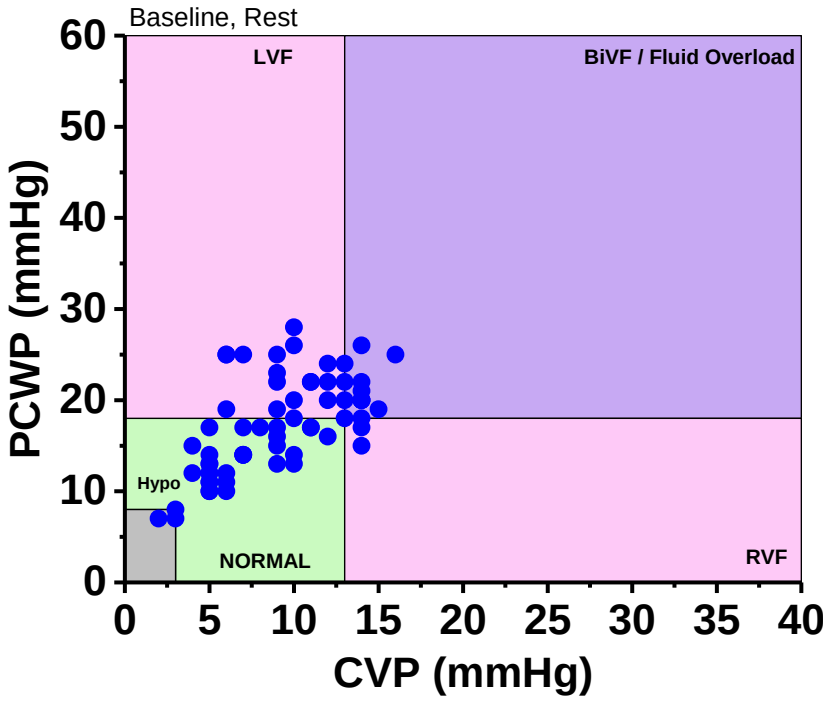


(*J Cardiac Fail 2014;20:212–221*)

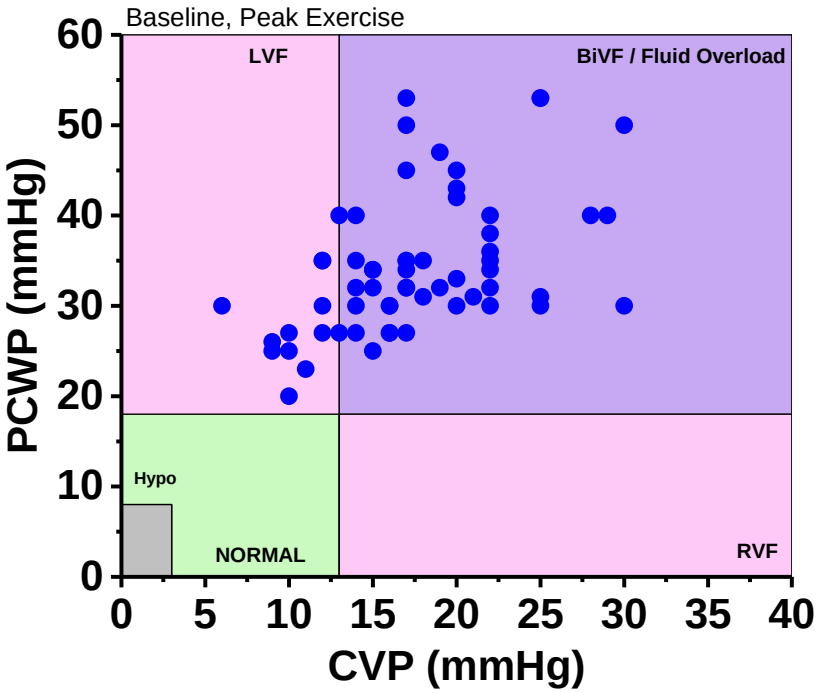
LA Decompression for CHF: **WHY?**

Both CVP and PCWP Increase with Exercise in HFpEF/HFmrEF

REST

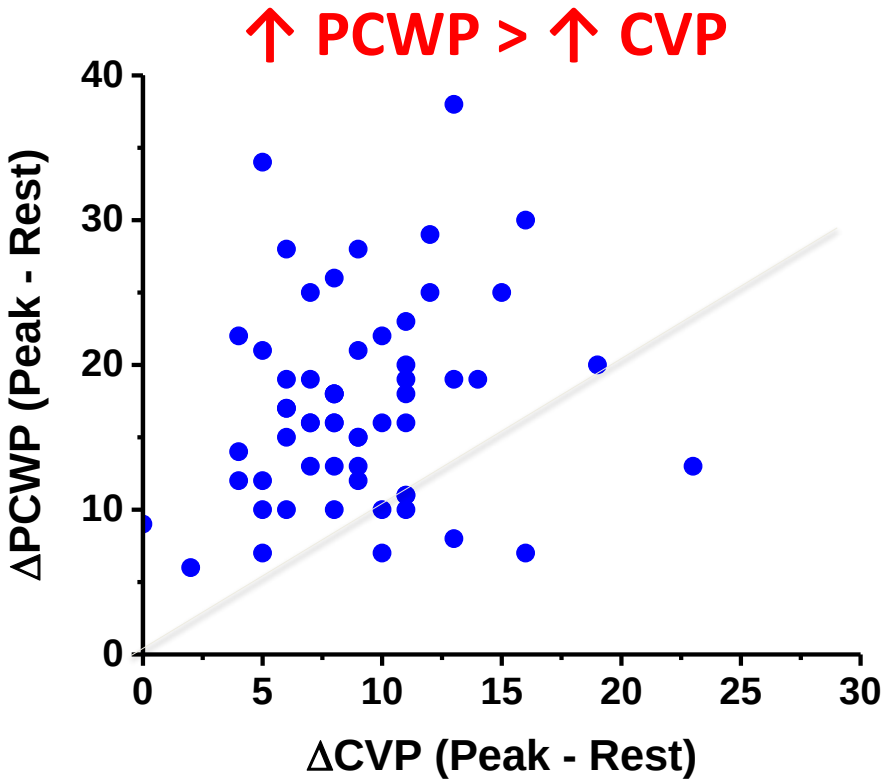


EXERCISE



Wessler et al, in review

LA Decompression for CHF: **WHY?**



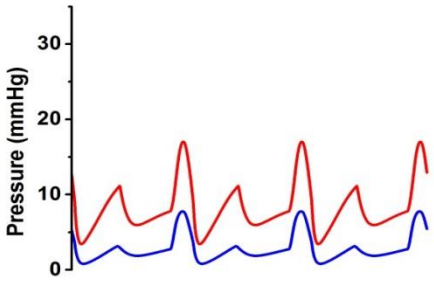
Exercise induced elevation of PCWP is greater than the rise of CVP, meaning the LA-RA pressure gradient increases during exercise:

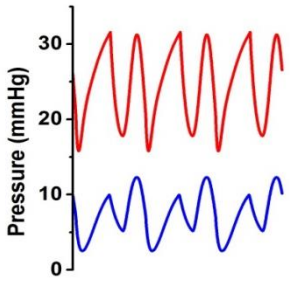
the gradient is the driving force

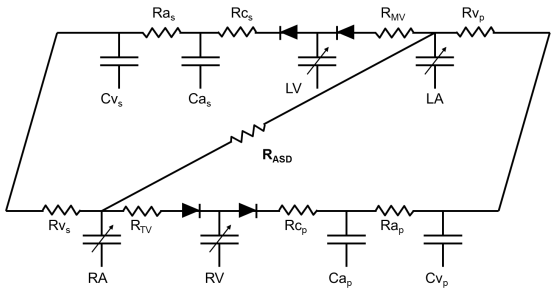
Computer Simulation of Atrial Pressures Without Shunt

LA
RA

No Shunt

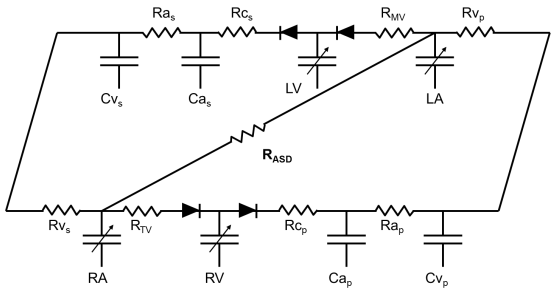






David Kaye, Sanjiv J. Shah, Barry A. Borlaug, Finn Gustafsson, Jan Komtebedde, Spencer Kubo, Chris Magnin, Mathew S. Maurer, Ted Feldman, Daniel Burkhoff,. Effects of an Interatrial Shunt on Rest and Exercise Hemodynamics: Results of a Computer Simulation in Heart Failure. Journal of Cardiac Failure. 2014;20(3):212-221.

Computer Simulation of Atrial Pressures With Shunt

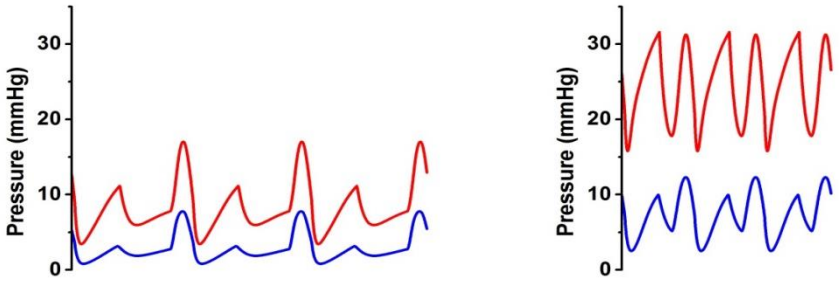


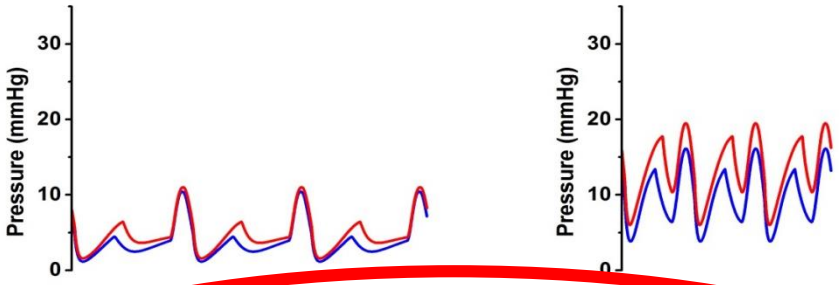
LA
RA

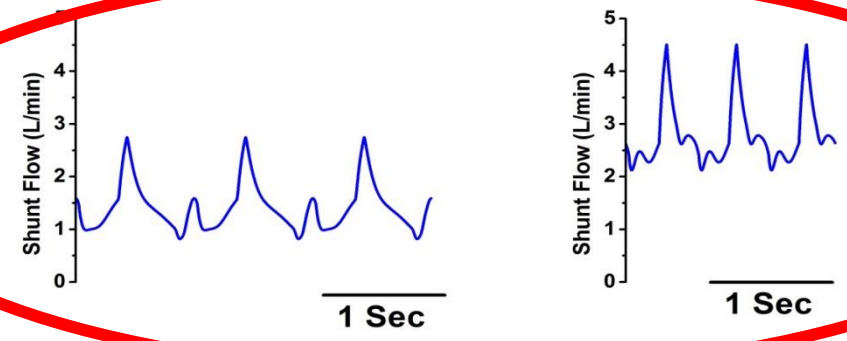
Rest | Exercise

No Shunt

With Shunt





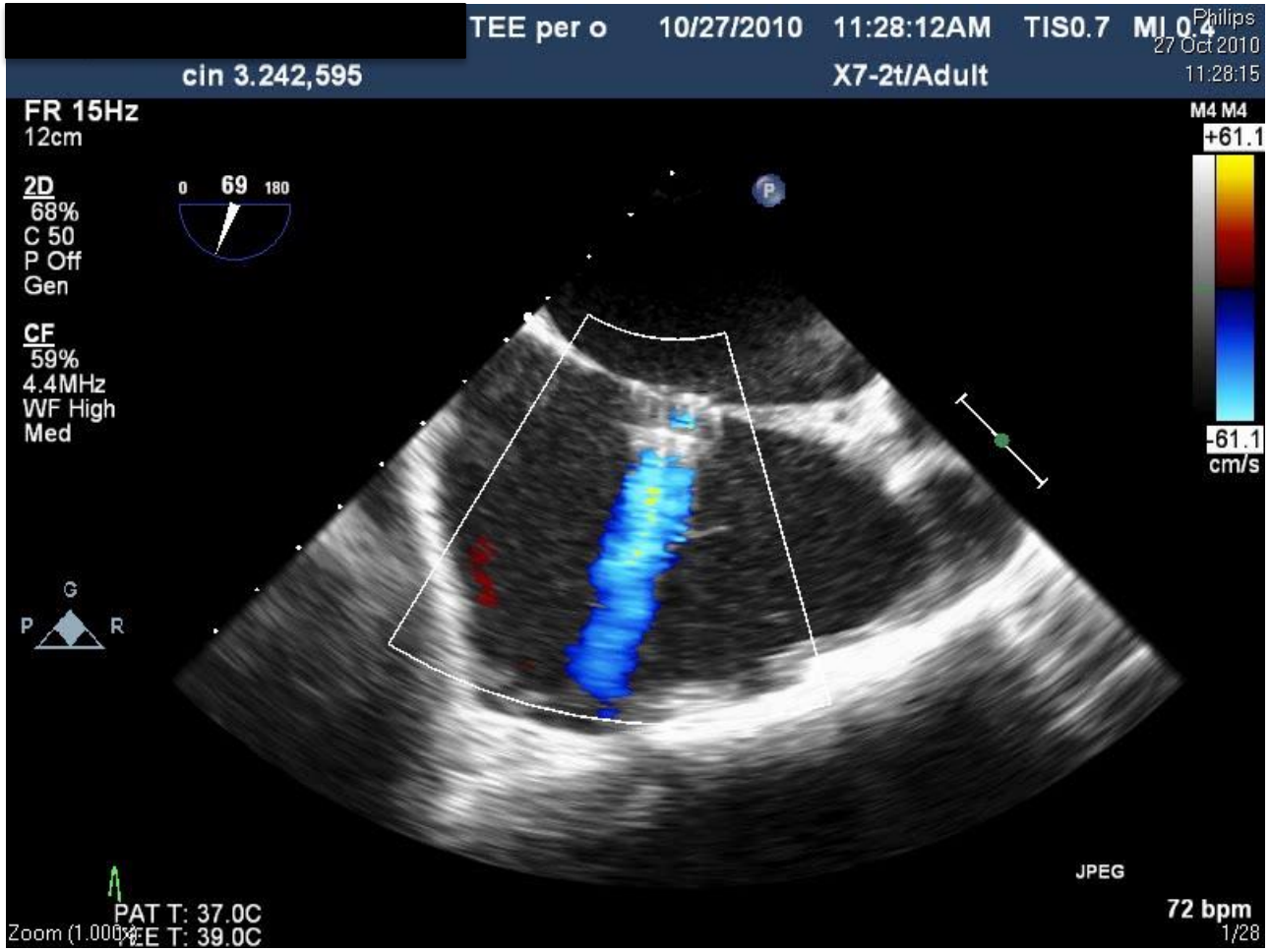


Continuous L→R Flow

Kaye et al JCardFail 2014

Qp:Qs ≈ 1.2-1.3

Continuous L→ R Flow

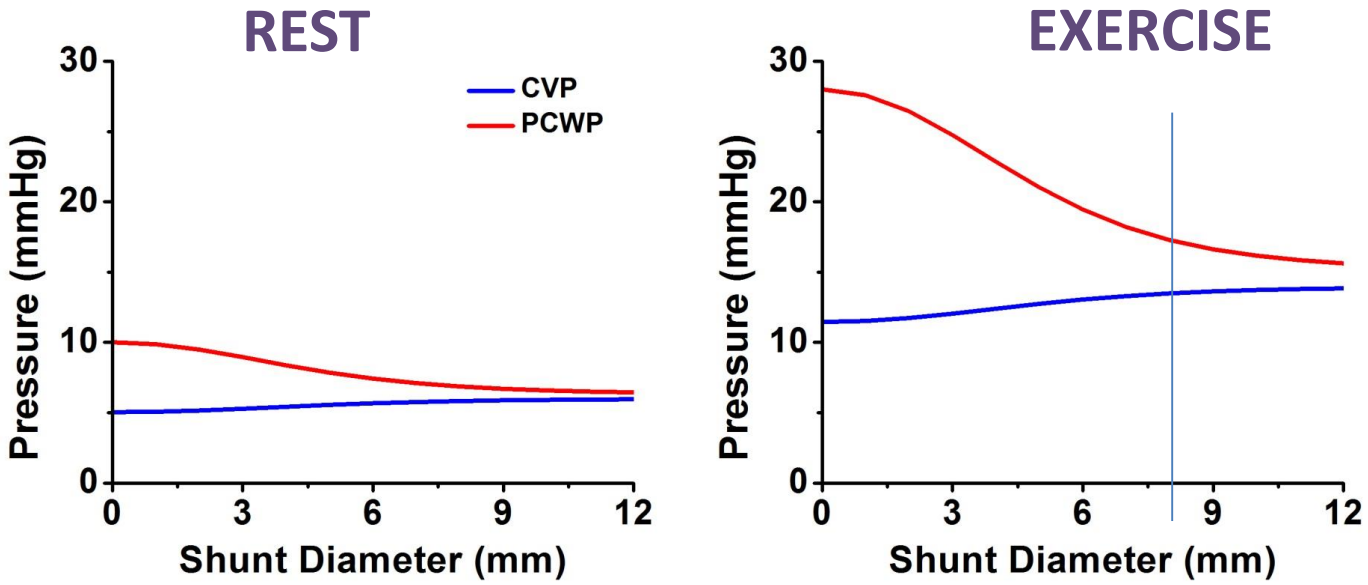


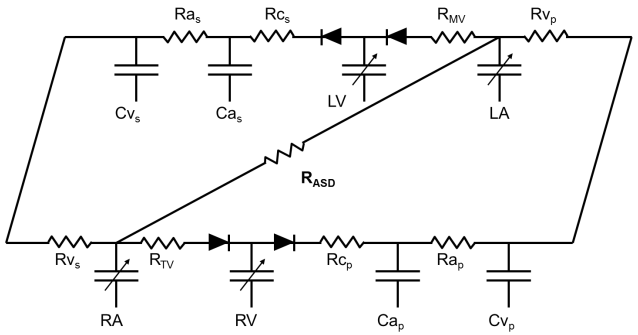
45 Days after implant

LA Decompression for CHF: **WHEN?**

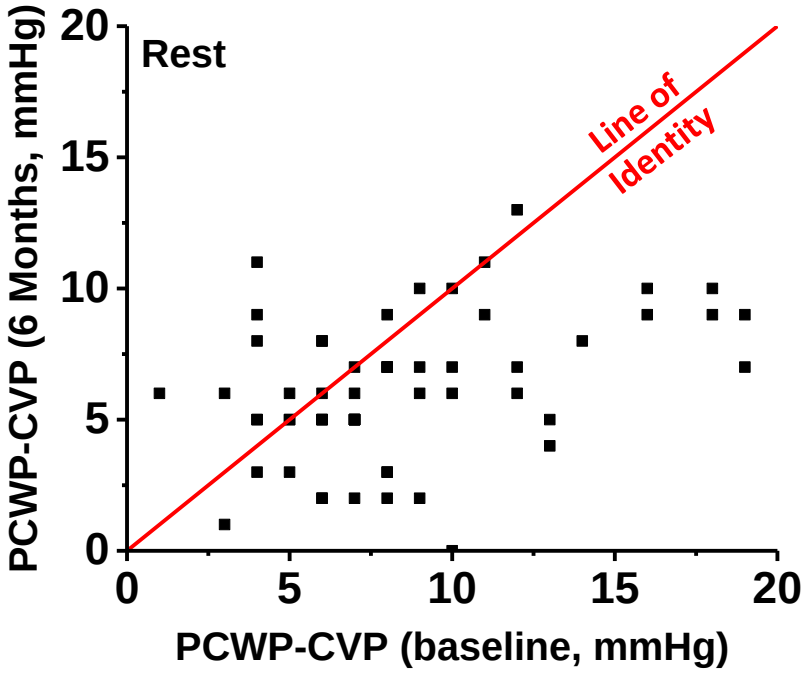
1. Persistent symptoms despite Guideline Directed Medical Therapy
2. Significant elevation of PCWP at rest or during exercise
3. Significant gradient between RA and LA (CVP and PCWP)

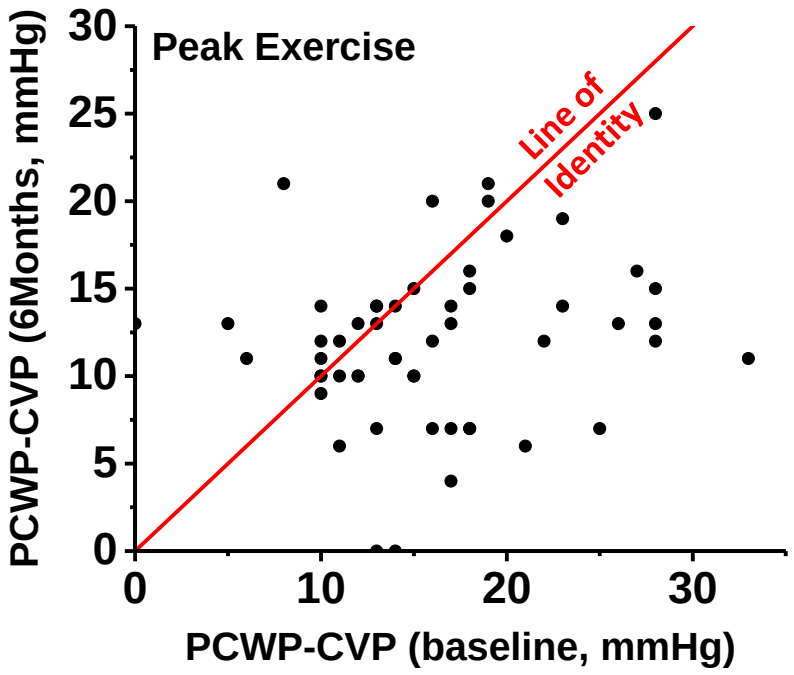
LA Decompression for CHF:
To What Extent?



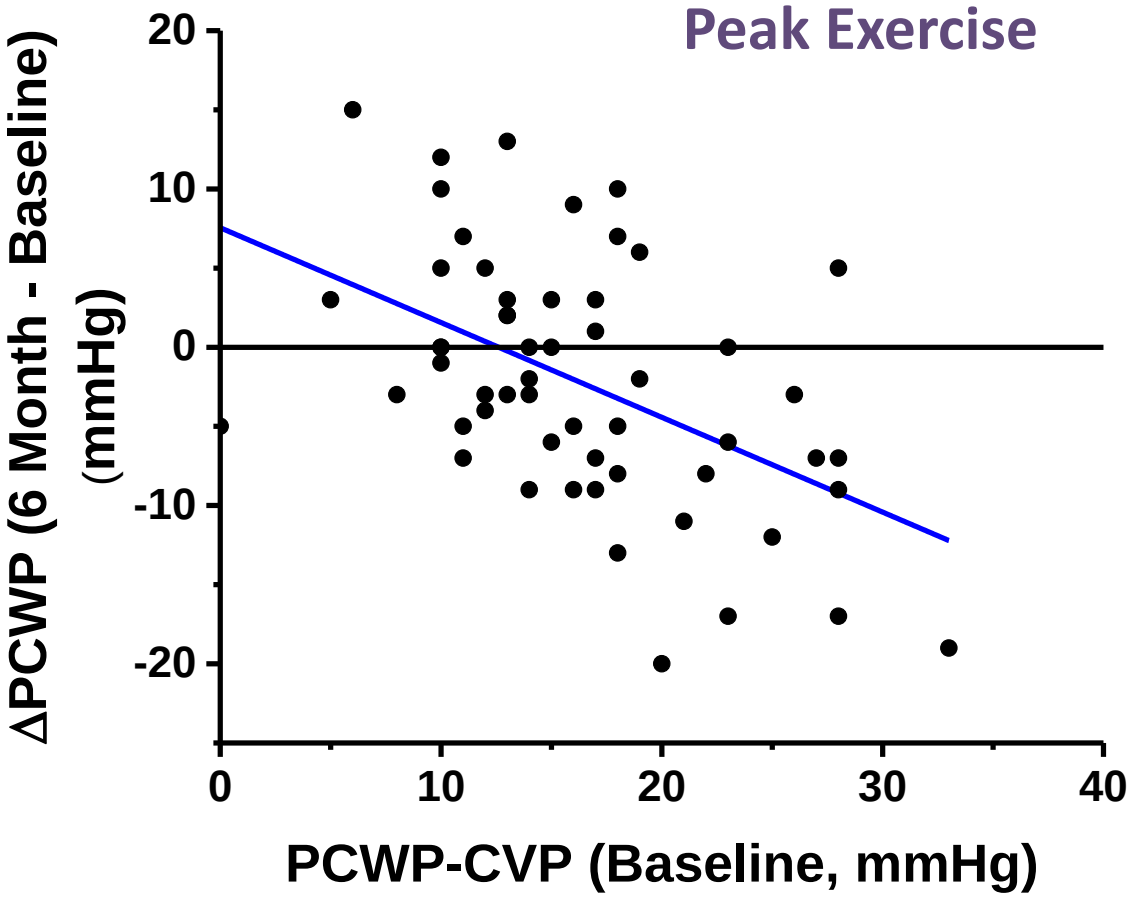


LA Decompression for CHF: To What Extent?

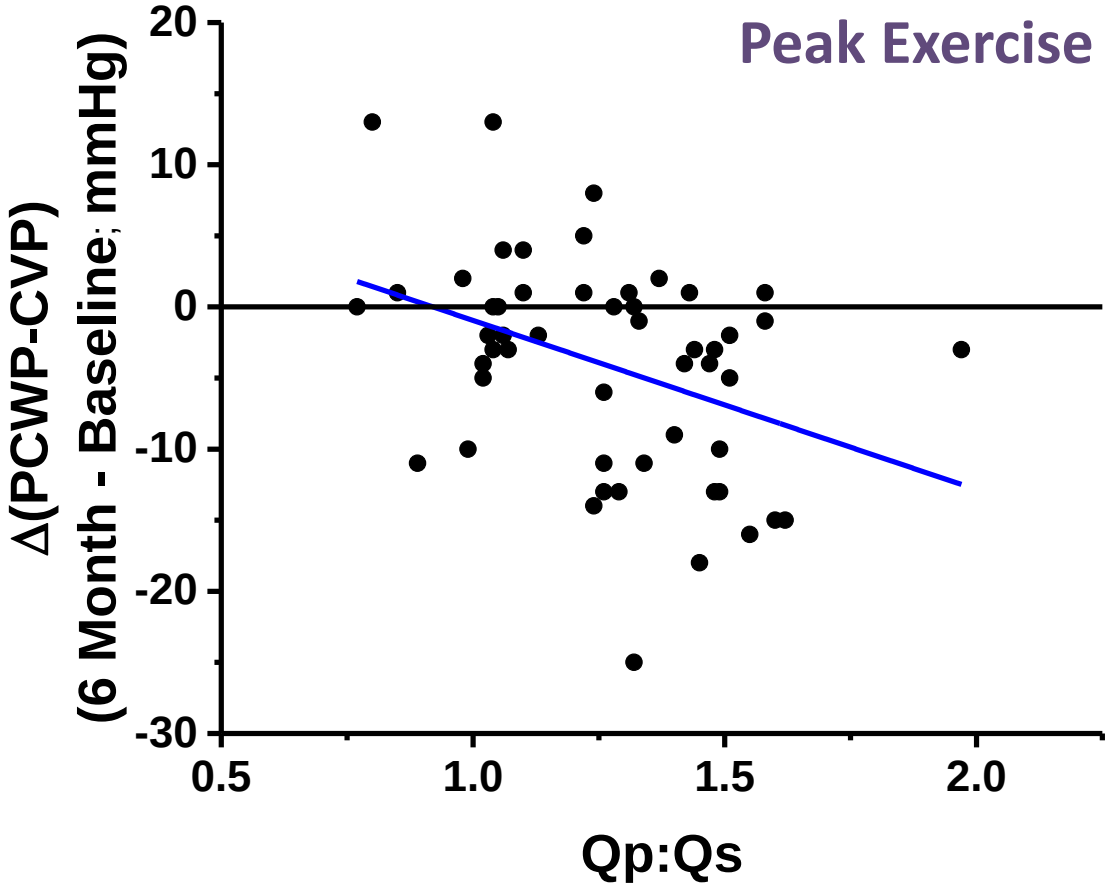




LA Decompression for CHF:
To What Extent?



LA Decompression for CHF:
To What Extent?



LA Decompression: Summary

- **Why:**
  - Pulmonary pressures rise significantly during exercise and this contributes to symptoms and mortality
- **When:**
  - Persistent symptoms despite GDMT
  - PCWP high and rises with exertion
  - PCWP-CVP pressure gradient
- **To What Extent:**
  - The relationship between flow and shunt diameter is relatively steep between 3 and 10 mm
    - 8 mm provides Qp:Qs ~1.2-1.3
  - The amount of shunting plateaus with LA-RA communication ~10mm
  - Reduction of pressure gradient dependent on the size of the gradient at baseline