

Identifying the 'sweet spot' for invasive hemodynamic monitoring

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Conflict of Interest Disclosures

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Treatment of HF with reduced ejection fraction

a journey of success

- ACE/ARB
- Betablockers
- MRAs
- Sacubitril/valsartan
- SGLT-2i
- CRT
- ICD
- Ivabradine
- Vericiguat

But....

20-year trends in cause-specific heart failure outcomes by sex, socioeconomic status, and place of diagnosis: a population-based study

Claire A Lawson, Francesco Zaccardi, Iain Squire, Suping Ling, Melanie J Davies, Carolyn S P Lam, Mamas A Mamas, Kamlesh Khunti, Umesh T Kadam

B Heart failure



Lancet Public Health 2019; 4: e406–20

and HFpEF....

• Limited treatment options

Pulmonary hypertension in LV failure:

- Associated with worse survival
- Increases in LV filling pressure (mPAP) precede increases in weight during decompensation by several days.

Pulmonary artery pressure sensors ?



The CardioMEMS[™] HF System







Wireless pulmonary artery haemodynamic monitoring in chronic heart failure: a randomised controlled trial

William T Abraham, Philip B Adamson, Robert C Bourge, Mark F Aaron, Maria Rosa Costanzo, Lynne W Stevenson, Warren Strickland, Suresh Neelaqaru, Nirav Raval, Steven Krueger, Stanislav Weiner, David Shavelle, Bradley Jeffries, Jay S Yadav, for the CHAMPION Trial Study Group*



Figure 3: Cumulative heart-failure-related hospitalisations during entire period of randomised single-blind follow-up (A), and freedom from first heart-failure-related hospitalisation or mortality during the entire period of randomised follow-up (B)

NYHA III + Prior HF admission

HFpEF and HFrEF

Lancet 2011; 377: 658-66

Haemodynamic-guided management of heart failure (GUIDE-HF): a randomised controlled trial

JoAnn Lindenfeld, Michael R Zile, Akshay S Desai, Kunjan Bhatt, Anique Ducharme, Douglas Horstmanshof, Selim R Krim, Alan Maisel, Mandeep R Mehra, Sara Paul, Samuel F Sears, Andrew J Sauer, Frank Smart, Marcel Zughaib, Paige Castaneda, Jean Kelly, Nessa Johnson, Poornima Sood, Greg Ginn, John Henderson, Philip B Adamson, Maria Rosa Costanzo



A Primary outcome: all-cause mortality, heart failure hospitalisations,

Lancet 2021; 398: 991-1001

Guide-HF: Pre COVID outcome analysis



Lancet 2021; 398: 991-1001

The GUIDE-HF trial of pulmonary artery pressure monitoring in heart failure: impact of the COVID-19 pandemic



Eur Heart J 2022: In press

12

Interaction with NYHA class

	n	Treatment events (rate)	Control events (rate)		Hazard ratio (95% CI)	Subgroup p value	PInteraction
Overall	1000	253 (0.563)	289 (0-640)		0.88 (0.74–1.05)	0.16	
NYHA class							
II*	296	53 (0.401)	75 (0.554)		0.72 (0.50-1.05)	0.086	0.095
III	650	171 (0.589)	198 (0.677)		0.87 (0.70–1.08)	0.21	
IV*	54	29 (1.527)	16 (0.910)	 	1.68 (0.88–3.20)	0.12	
II and III*	946	224 (0.525)	273 (0.633)		0.83 (0.69–1.00)	0.050	0.046†

Case

- 69 year old woman with non-ischemic DCM
- 2014 Mitraclip for FR. Has ICD.
- Referred because of persistent NYHA IIIb
- Four hospital admissions for HF within last 6 months
- PVR too high for heart transplantation
- Declines LVAD







Attempted aggressive management with diuretics and vasodilators, but low BP and recurrent near syncope





implant

The Utility of a Wireless Implantable Hemodynamic Monitoring System in Patients Requiring Mechanical Circulatory Support

David S. Feldman,*§ Nader Moazami,† Philip B. Adamson,‡ Juliane Vierecke,§ Nir Raval,¶ Satya Shreenivas,* Barry M. Cabuay,∥ Javier Jimenez,# William T. Abraham,** John B. O'Connell,‡ and Yoshifumi Naka‡†



ASAIO Journal 2018; 64:301–308.

Specific populations where PAP monitoring might be particularly useful?



Pulmonary Artery Pressure Monitoring Effectively Guides Management to Reduce Heart Failure Hospitalizations in Obesity

D. Marshall Brinkley, MD,^a Maya E. Guglin, MD, PHD,^b Mosi K. Bennett, MD, PHD,^c Margaret M. Redfield, MD,^d William T. Abraham, MD,^e Marie-Elena Brett, PHD,^f Nicholas Dirckx, MPH,^f Philip B. Adamson, MD,^f Lynne W. Stevenson, MD^a





(J Am Coll Cardiol HF 2021;9:784-794)

Other devices





Our current practice based on data and experience

• NYHA II-III patients with:

- Recurrent HF hospitalization despite serious attempts to optimize GDMT and fluid status
- eGFR > 30
- Preserved BP (SBP > 100 mmHg)
- Motivated
- Difficult clinical assessment of fluid status strengthens indication

Take home

- PAP monitoring reduced HFH/mortality in NYHA III patients in CHAMPION
- PAP monitoring did not reduce the overall occurence of the primary endpoint in GUIDE-HF
- In GUIDE-HF an effect consistent with that seen in CHAMPION was seen in the preCOVID period
- Patients may become too advanced to benefit from PAP monitoring (NYHA IV, renal failure, hypotension)
- Some advanced HF patients may still benefit in terms of timing of HTX/LVAD
- The role of PAP monitoring in advanced HF remains to be established.
- Observational data (and the experience in our center) suggest that PAP monitoring may be particularly useful in patients where clinical assessment of volume status is challenging.