Initial Six Month Results of a Novel Inter-atrial Shunt Therapy for Heart Failure with Preserved Ejection Fraction

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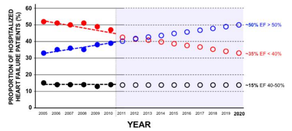
Background

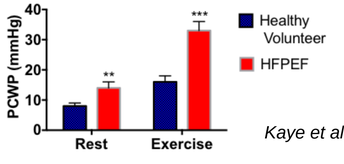
Approximately 50% of patients presenting with clinical features of heart failure have a preserved ejection fraction (arbitrarily >45%) = "HFPEF".

The incidence of HFPEF is progressively rising, and will become the predominant form of HF.



Patients with HFPEF and HFREF are similarly affected in relation to symptomatic limitation, hospitalization and survival.

The fundamental pathophysiologic basis for the HFPEF phenotype is impaired diastolic reserve, which manifests itself as elevated resting or as a rapid increase in LVEDP, LAP and pulmonary artery pressures during low level physical activity.



Kaye et al (Unpublished)

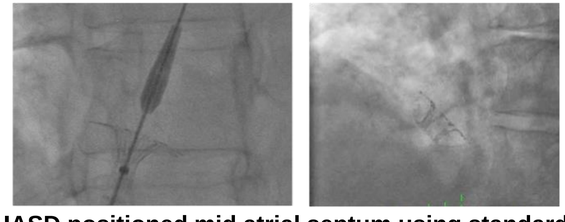
The structural basis of the impaired diastolic reserve remains somewhat controversial, and includes myocardial fibrosis, microvascular endothelial dysfunction, contractile protein abnormalities together with ventriculo-vascular coupling mismatch.

Background (continued)

In contrast to HFREF, multiple pharmacological studies in HFPEF have failed to provide clinical benefit (CHARM-preserved, I-PRESERVE, HF-PEF, Aldo-DHF, RELAX-HF, PARAMOUNT, TOPCAT)

Given the failure of pharmacological approaches, the potential for a device based approach has been developed, in part based upon the observation that patients with Lutembacher's syndrome (ASD + Mitral Stenosis) are less symptomatic than MS without ASD.

DC Device Inter-atrial Shunt Device (IASD)



IASD positioned mid atrial septum using standard trans-septal approach under TEE or ICE imaging

Objectives

To evaluate the safety and clinical efficacy of creating a permanent, small inter-atrial shunt in HFPEF patients to decompress the LA using an inter-atrial shunt device (IASD).

Methods and Results

KEY PATIENT SELECTION CRITERIA

INCLUSION:

- Age > 40;
- NYHA III-IV for ≥3months, or ≥1 HF admit in 12 months;
- LVEF ≥ 45%;
- LVEDP or PCWP > 15 mmHg at rest, or >25 during exercise.

EXCLUSION:

- Significant CAD;
- Significant valve disease;
- RVSP or PAsys > 60 mmHg;
- Pacemaker leads;
- DVT;
- Amyloidosis.

Baseline Demographics (n=11)

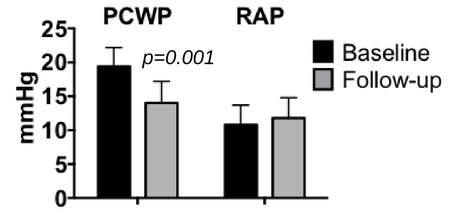
Parameter	Mean ± SD	(Range)
Age (yrs)	**70 +/- 11.9**	(55-87)
Age > 75 (%)	**45**	
Female (%)	**55**	
BMI (kg/m^2)	**33 +/- 7.93**	(18.7-44.1)
EF (%)	**57% +/- 9**	(40-65)
Advanced HF (%) (NYHA Class III/IV)	**100%** (9/2)	
Average (Septal & Lateral) E/e' ratio (n=7)	**13.84 +/-6.73**	(7.8-27.5)
Prior HF Hospitalization (%)	**55**	
NT-Pro BNP (pmol/L) (n=9)	**193 +/- 153**	(22-461)
CAD/Prior CABG/PCI (%)	**36**	
Hypertension (%)	**91**	
Diabetes (%)	**45**	
CVA/TIA (%)	**0**	

Baseline Hemodynamic data (n=11)

Parameter	Mean ± SD	(Range)
AF (%)	**36**	
CI (L/min/m^2)	**2.5 +/- .4**	(2.1-3.3)
Systolic ABP (mm Hg)	**129 +/- 17.4**	(115-170)
Resting mean PCWP (mm Hg)	**18.2 +/- 4.9**	(6-25)
Resting mean RAP (mm Hg)	**10.2 +/- 3.5**	(3-15)
Resting gradient mean PCWP- RAP (mm Hg)	**7.5 +/- 3.03**	(3-13)
Resting s-PAP (mm Hg)	**42 +/- 13**	(27- 66)
Resting Trans Pulmonary Gradient (mm Hg) (n=10)	**12.5 +/- 4.4**	(7-20)
Resting Diastolic Pulmonary Gradient (mm Hg) (n=9)	**2.3 +/- 2.5**	(-2-6)
Peak VO_2 (n=8)	**13.7 +/- 4.0**	(7.3-18.9)

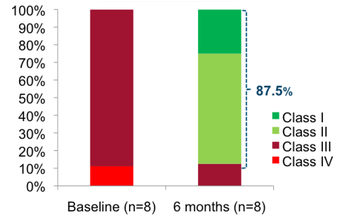
Results

HEMODYNAMICS



IASD device placement reduces PCWP at follow-up (30-90 d).

NYHA Class



Functional capacity, NT-BNP and QOL

Parameter	*Baseline*	*Follow-up (180d)*	*p value*
6 MWD (m) (n=7)	293 ± 115	343 ± 74	0.07
NT-Pro-BNP (pmol/L) (n=7)	213 ± 166	227 ± 150	0.34
MLWHF score (n=8)	51 ± 20	27 ± 14	0.01

Conclusions

This initial study demonstrates that placement of an interatrial shunt device in HFPEF patients is associated with favorable hemodynamic and clinical effects in the early to mid term. Further clinical studies are underway.

Disclosures: Study sponsored by DC Devices.