

The Robert TV Kung Interventional Heart Failure Fellowship Program Bringing Hope to the Hopeless at Tufts

Navin K. Kapur, MD, FACC, FSCAI, FAHA

Associate Professor, Department of Medicine

Interventional Cardiology & Advanced Heart Failure Programs

Executive Director, The Cardiovascular Center for Research & Innovation

Tufts Medical
Center
The CardioVascular Center



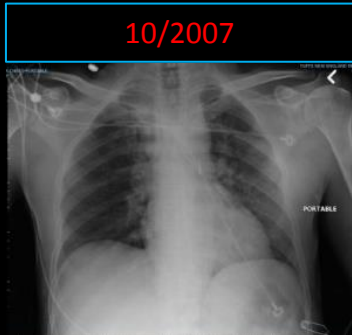
**The Acute MCS
Working Group**



MCRI20
Molecular Cardiology
Research Institute

One Patient's Interventional Heart Failure Experience

AMI-Shock



Anterior MI
LAD PCI and **IABP**
LVEF 20%

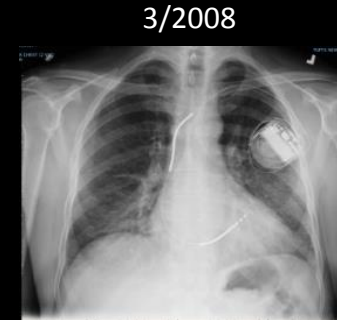
Recurrent HF



Readmitted
Heart Failure
LVEF 25%

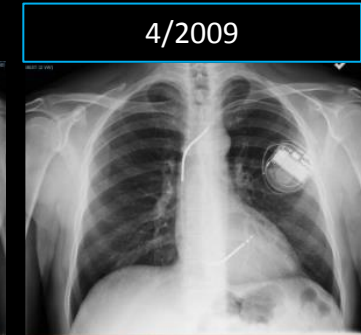


Readmitted - HF
ICD Implanted
LVEF 25%



Readmitted
Recurrent HF
LVEF 25%

HR-PCI

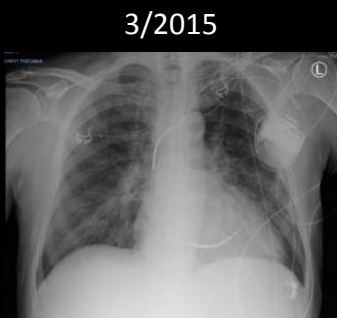


Readmitted – HF/ACS
Impella Supported
LAD and LCx PCI
LVEF 25%

Recurrent HF

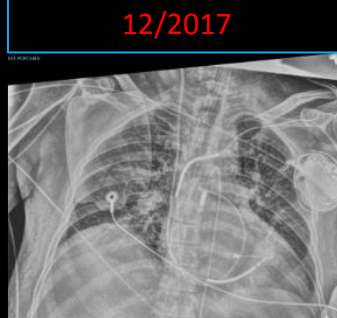


Readmitted
Recurrent HF
LVEF 20%



Readmitted
Recurrent HF
LVEF 20%

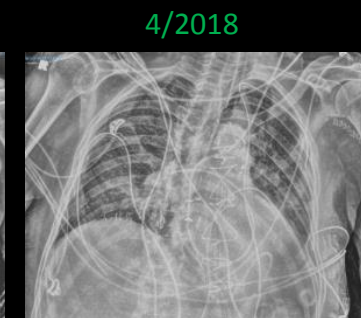
Advanced HF-Shock



Cardiogenic Shock
**Impella +
VA-ECMO**
LVEF 10%

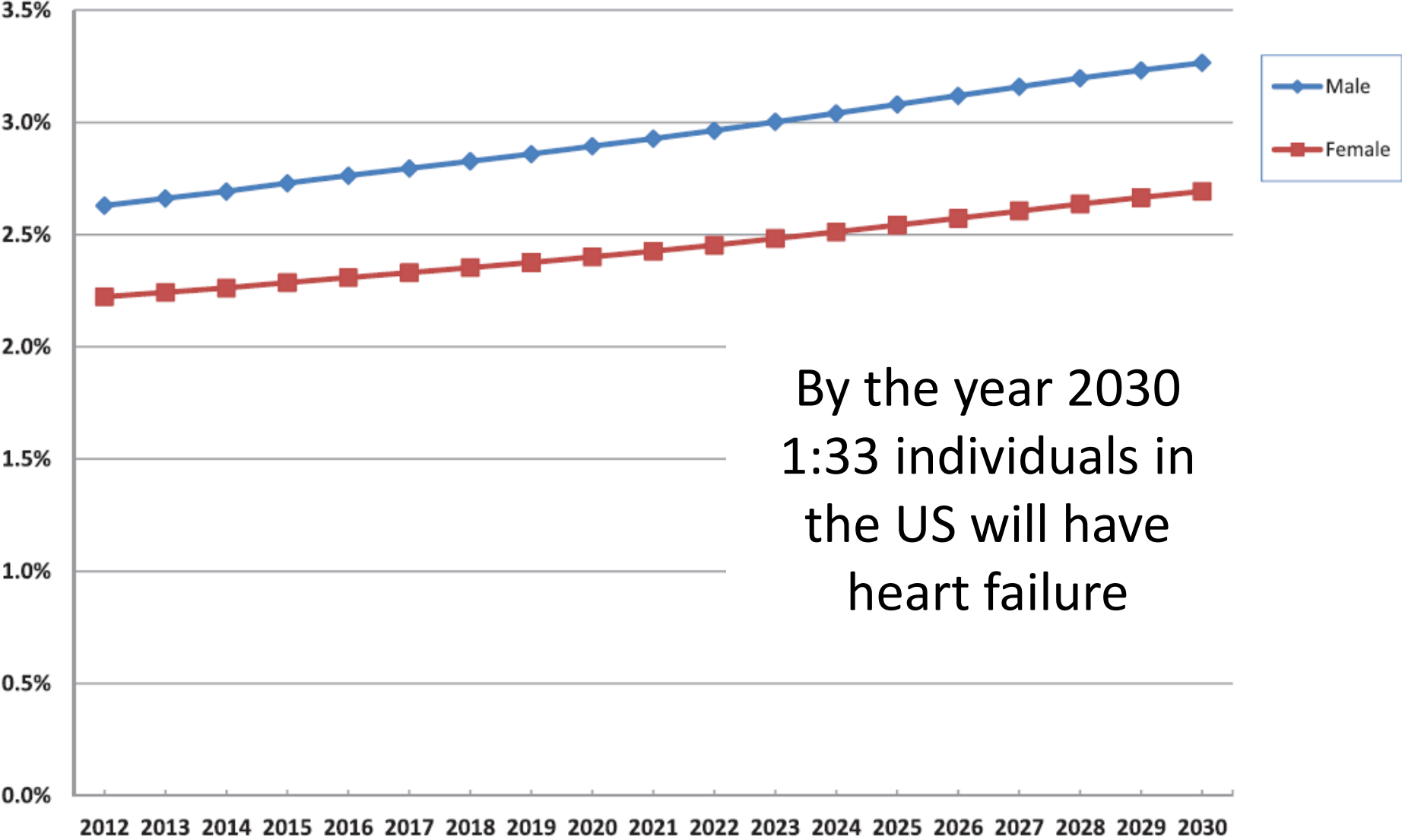


Cardiogenic Shock
**Biventricular
Centrimags**
LVEF 10%



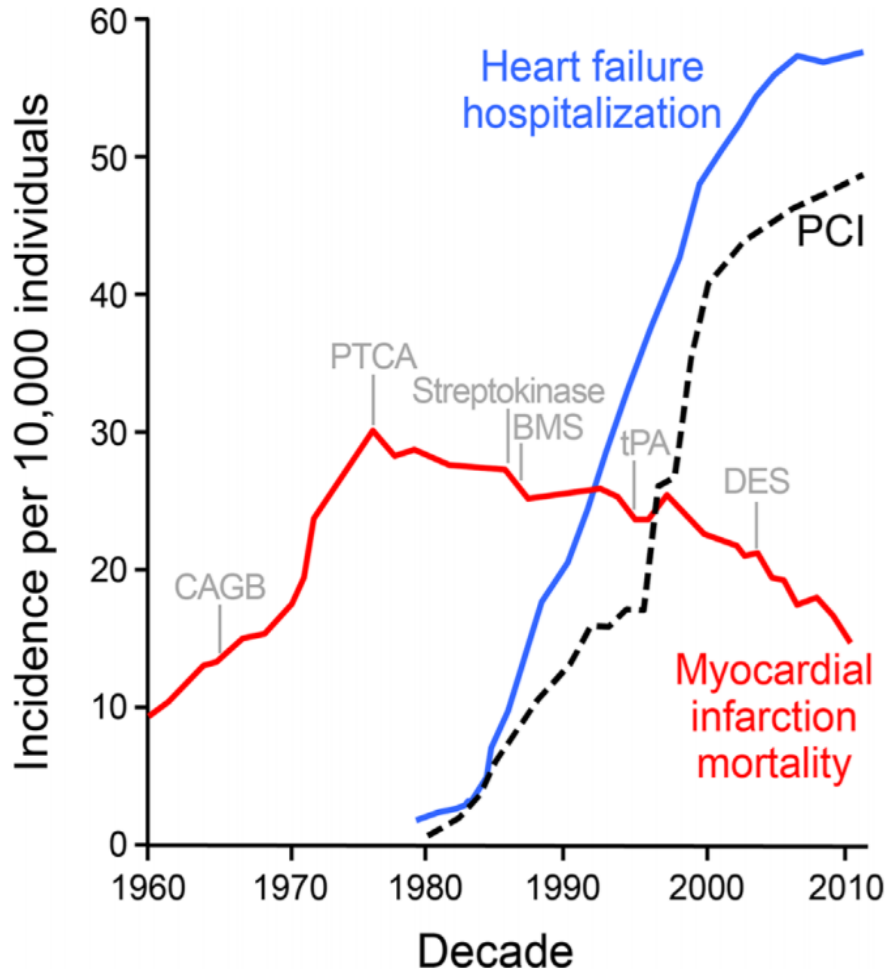
Orthotopic
Heart Transplant
LVEF 65%

The Heart Failure Epidemic

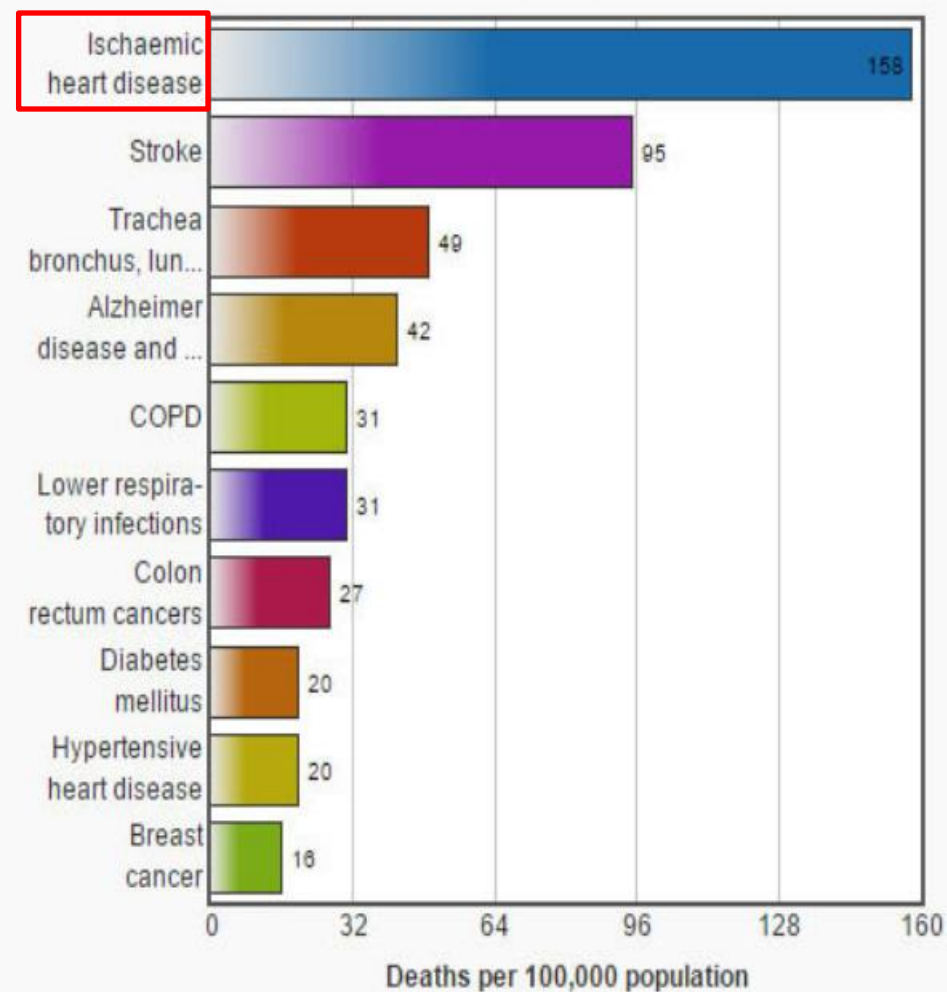


The Heart Failure Pandemic

From AMI to Ischemic Heart Failure

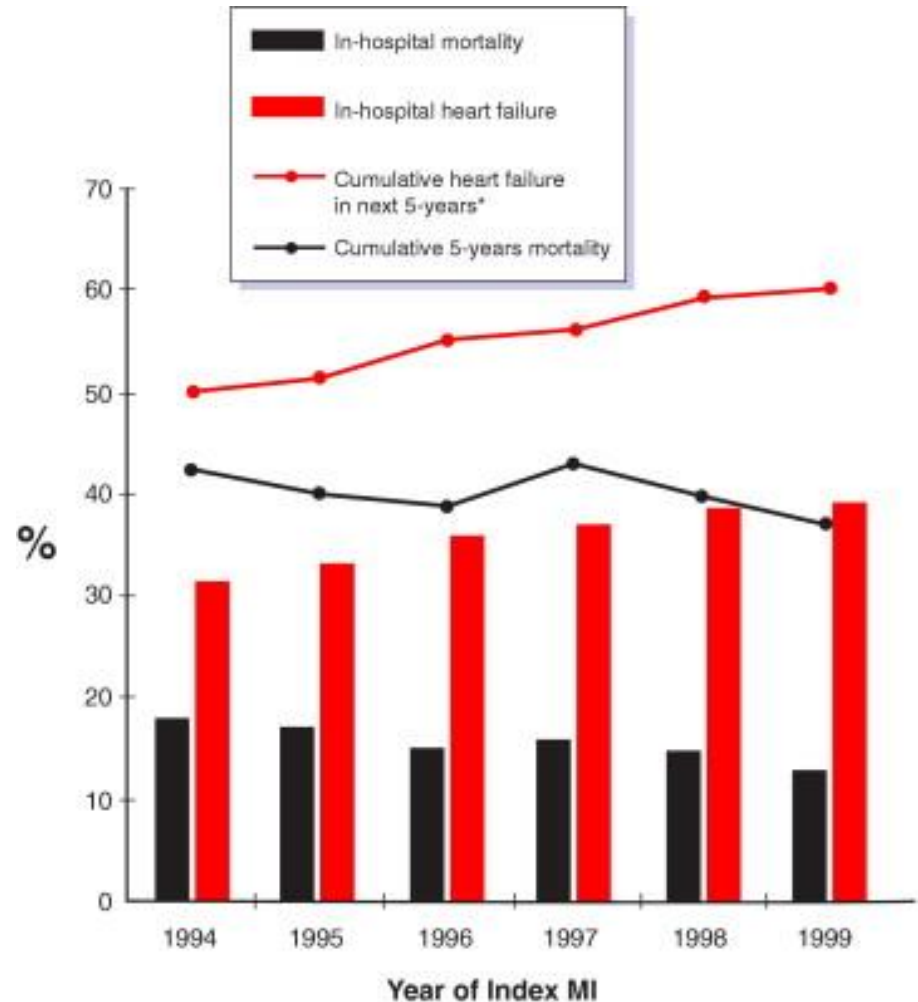
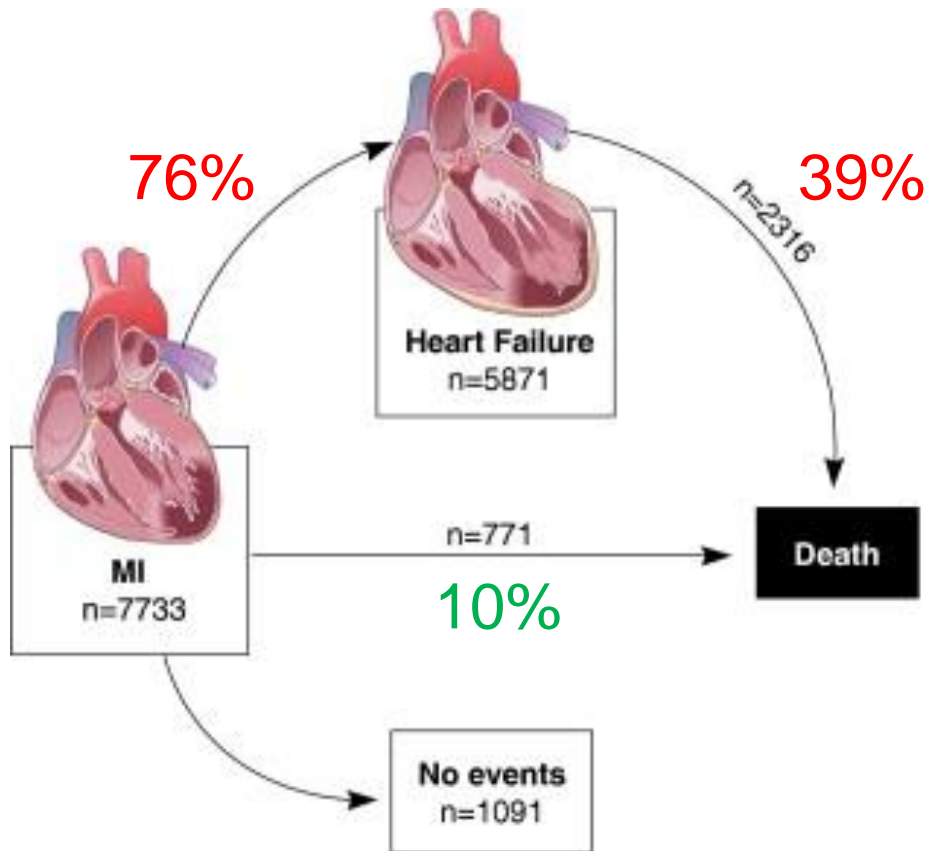


Top 10 Causes of Death Worldwide



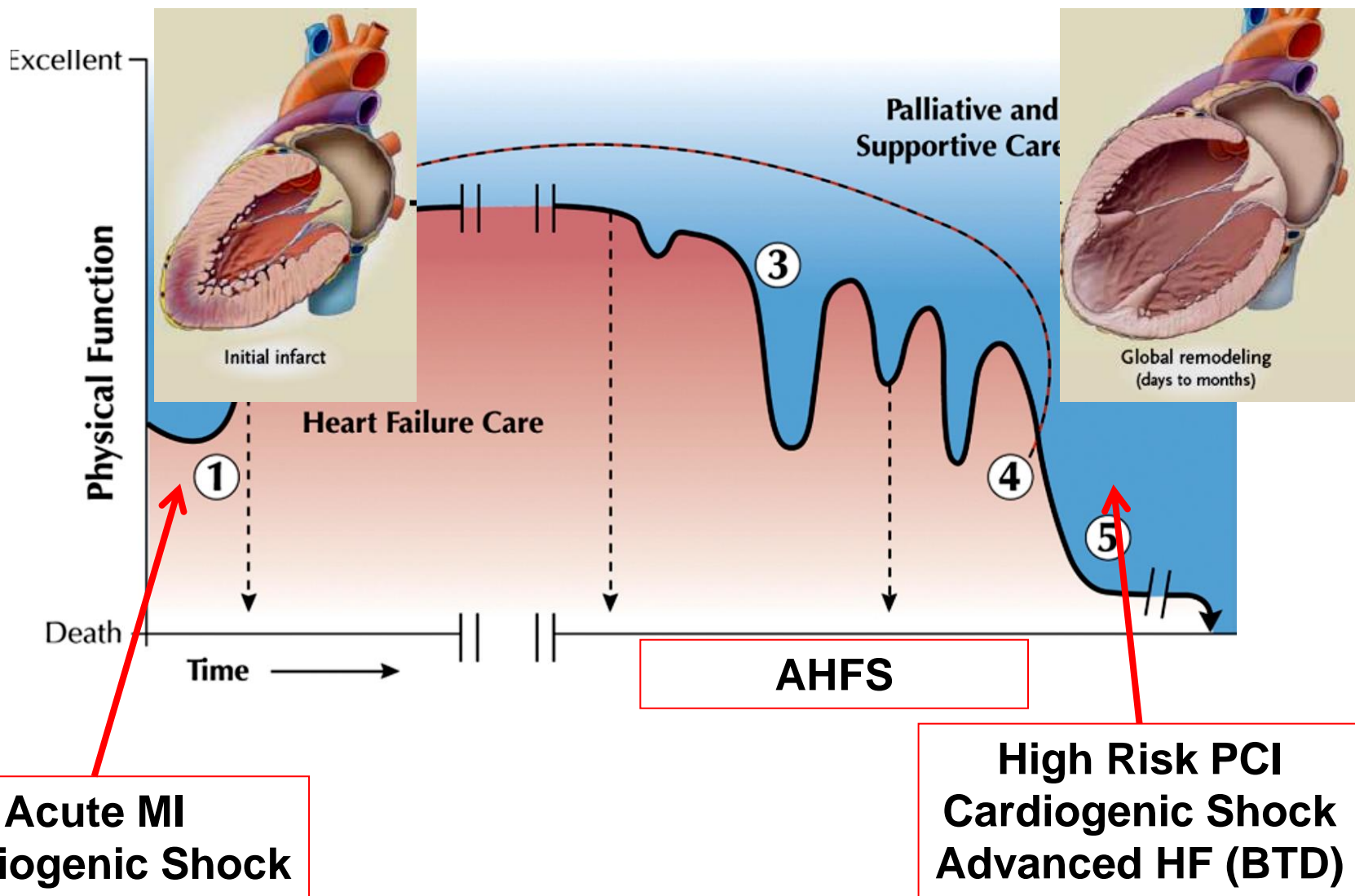
Heart Attacks Lead to Heart Failure

75% of AMI Patients Treated with Primary Reperfusion Develop Heart Failure Within 5 years



Longitudinal Care for our Cardiovascular Patients

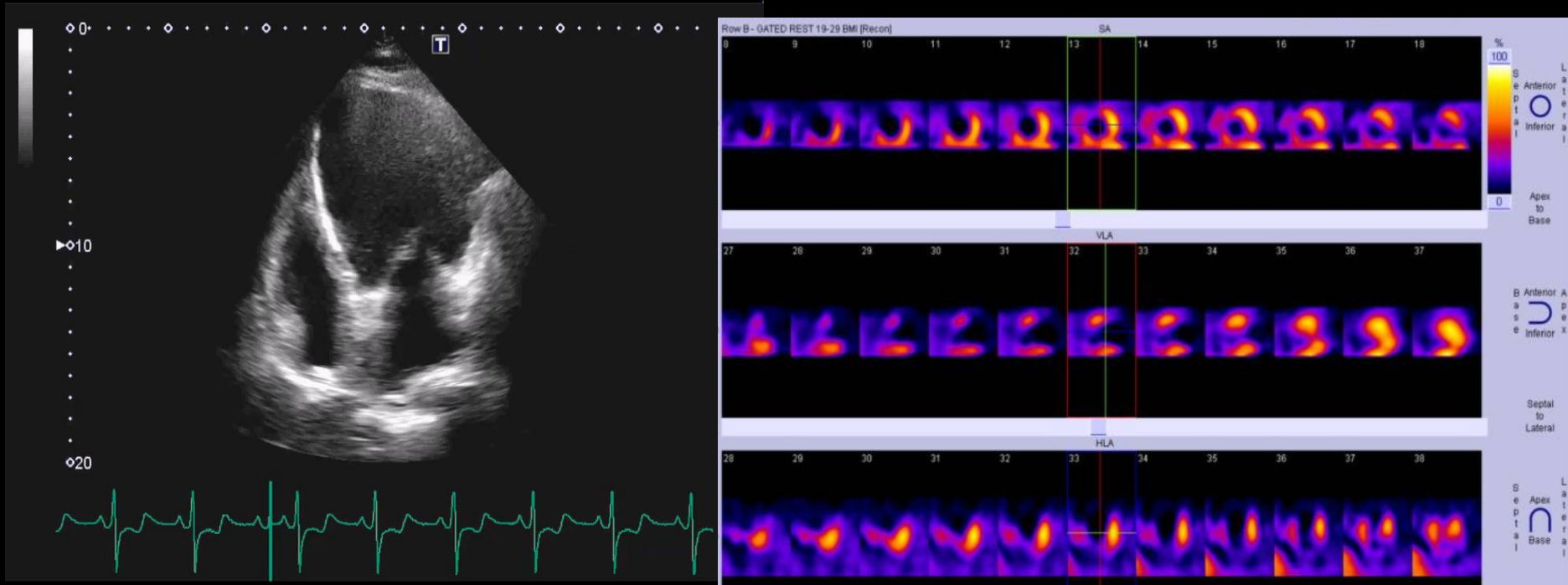
The Tufts Interventional Heart Failure (IHF) Program



IHF Domain 1: Complex Coronary Revascularization

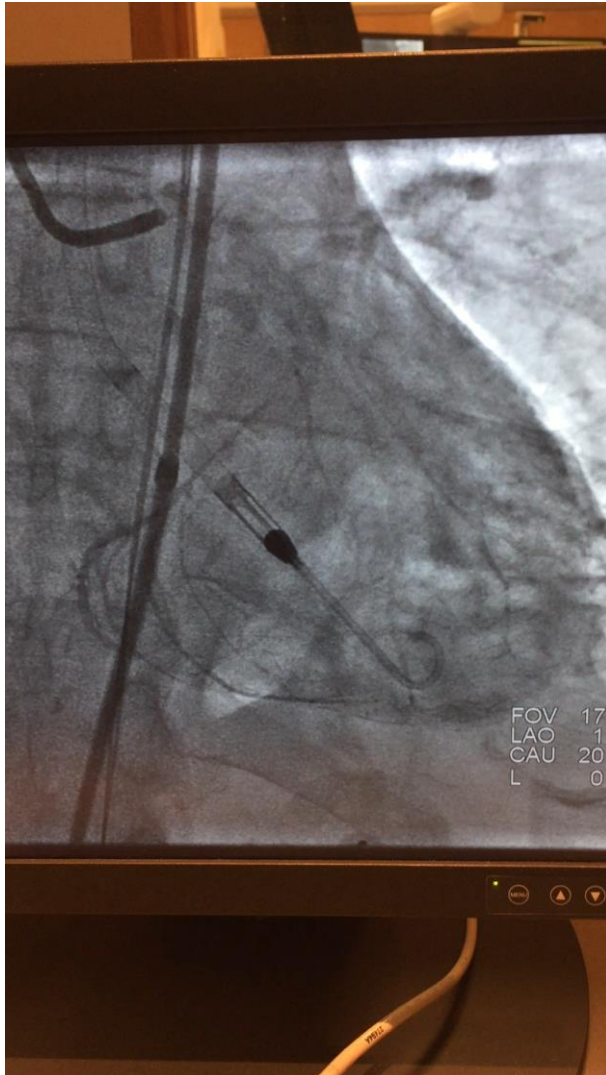
It's Dead !

It's Alive !



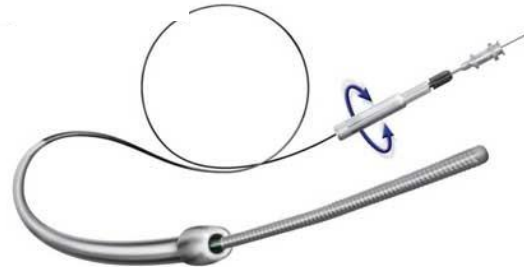
Do not attempt PCI in this case without hemodynamic support.

IHF Domain 1: Complex Coronary Revascularization: 50 yo M with LVEF 15% and moderate to severe MR Advanced HF → Cardiac Surgery → Interventional

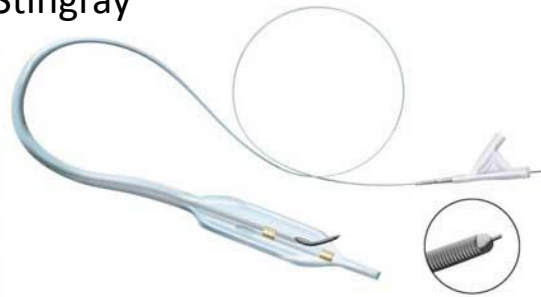


Antegrade
Dissection
Re-entry

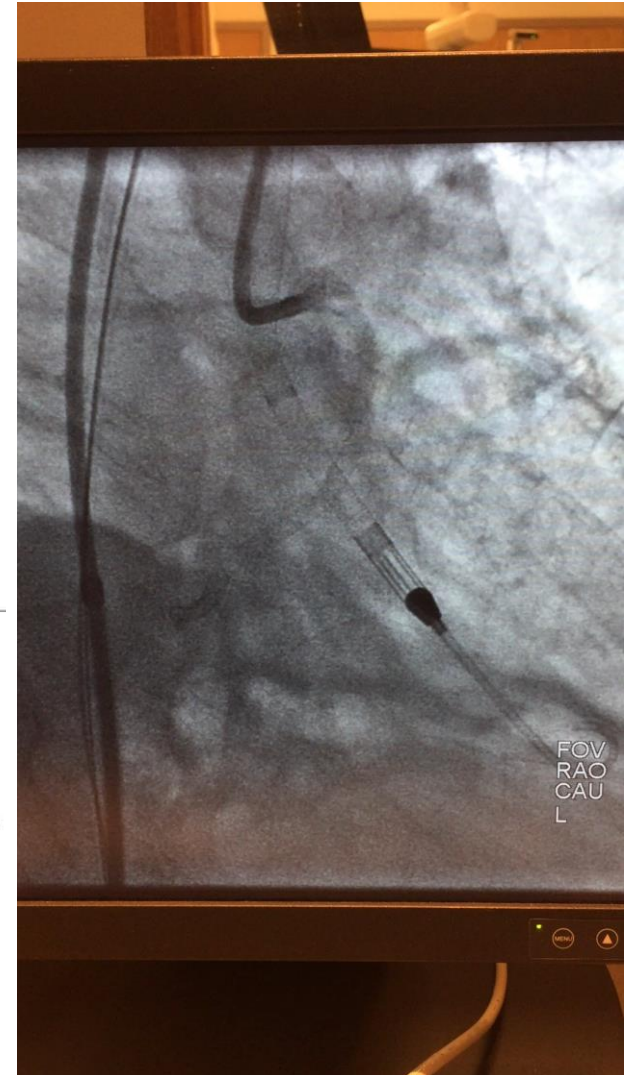
Cross-boss



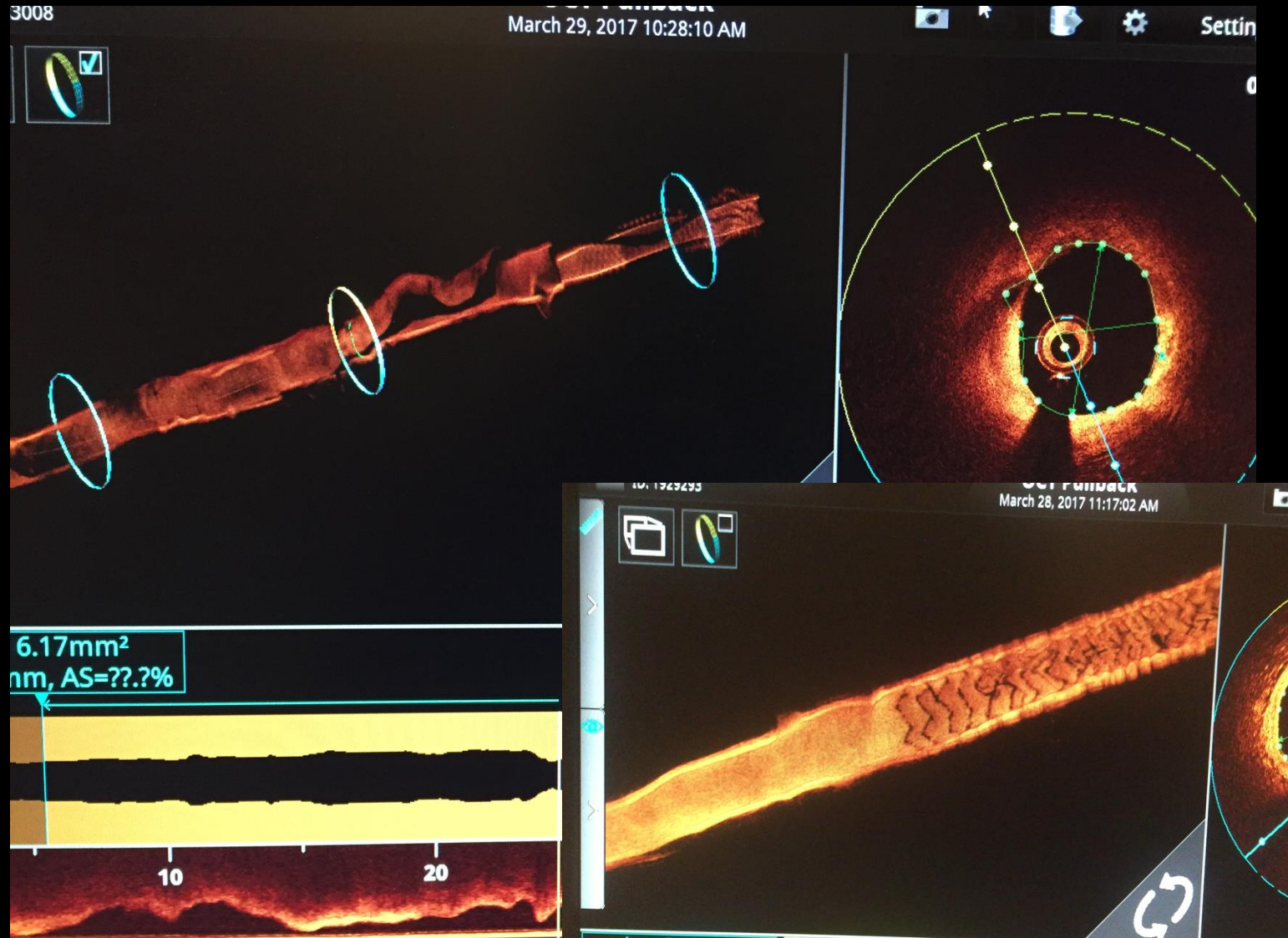
Stingray



Rahban Y (IHF 2017)

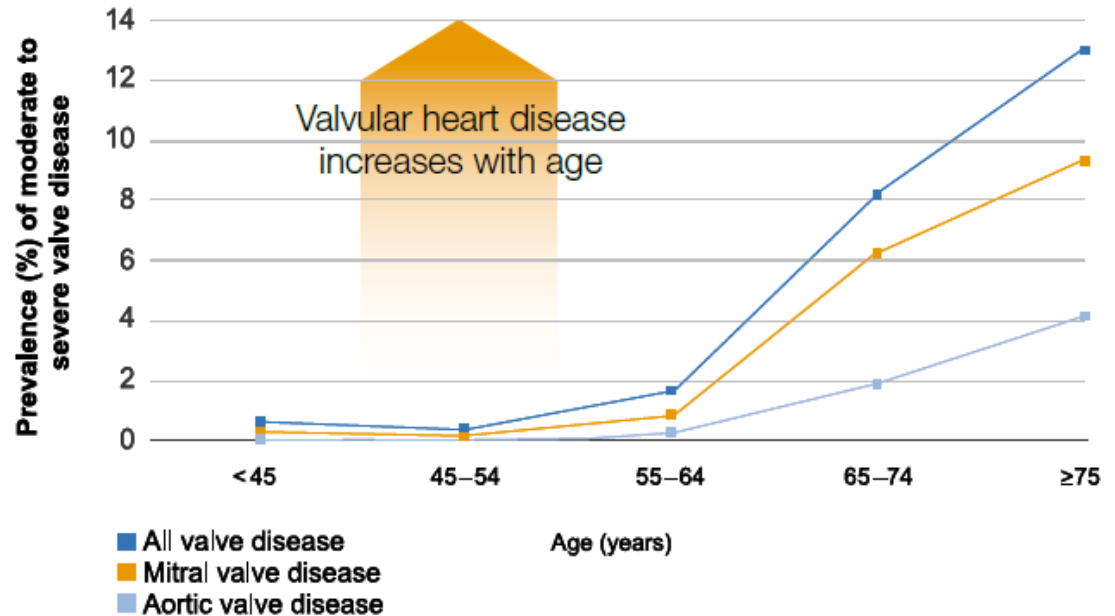
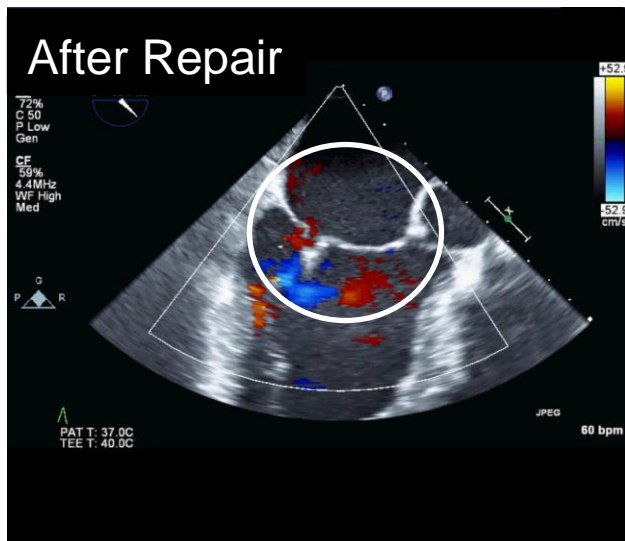
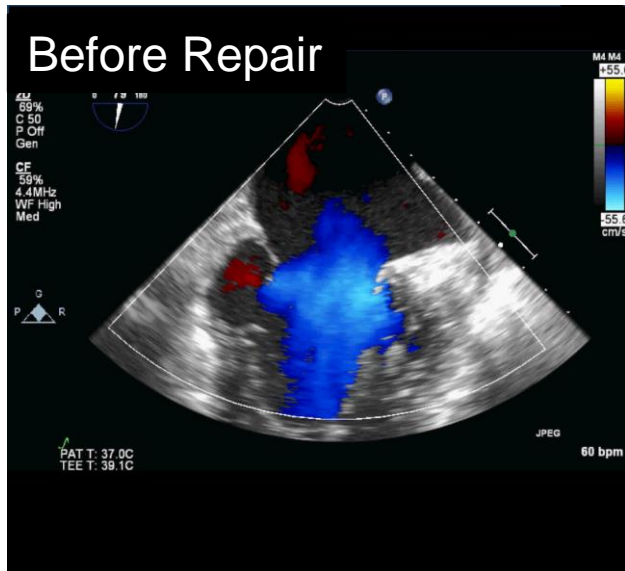


Advancing Intra-coronary Imaging Coronary Optical Coherence Tomography



IHF Domain 2: Valvular Heart Disease

75 yo M with LVEF 25% and severe MR + Porcelain Aorta
Advanced HF → Cardiac Surgery → Interventional



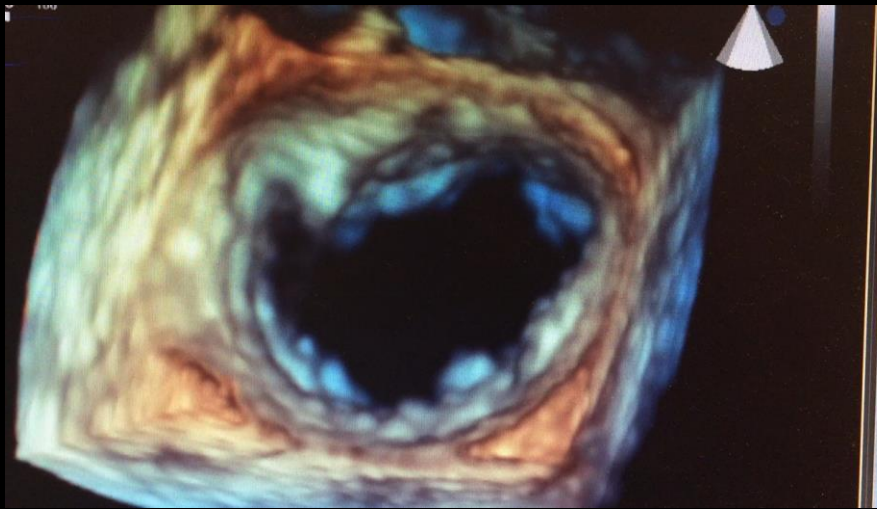
30-50% of HF patients have MR
Optimizing GDMT including CRT
MitraClip – Average 60-70 minutes/case

IHF Domain 2: Valvular Heart Disease

75 yo M with LVEF 25% and severe MR + Porcelain Aorta

Advanced HF → Cardiac Surgery → Interventional

Before Repair



After Repair



Interventional Team

Navin Kapur
Carey Kimmelstiel
Andrew Weintraub
Jen Eaton/Kristina Booher
Rich Botto/Gavin Adams

Advanced HF Team

Ayan Patel
Amanda Vest
Michael Kiernan
David DeNofrio/Jim Udelson
Marvin Konstam/Fred Chen

Clinical Teams

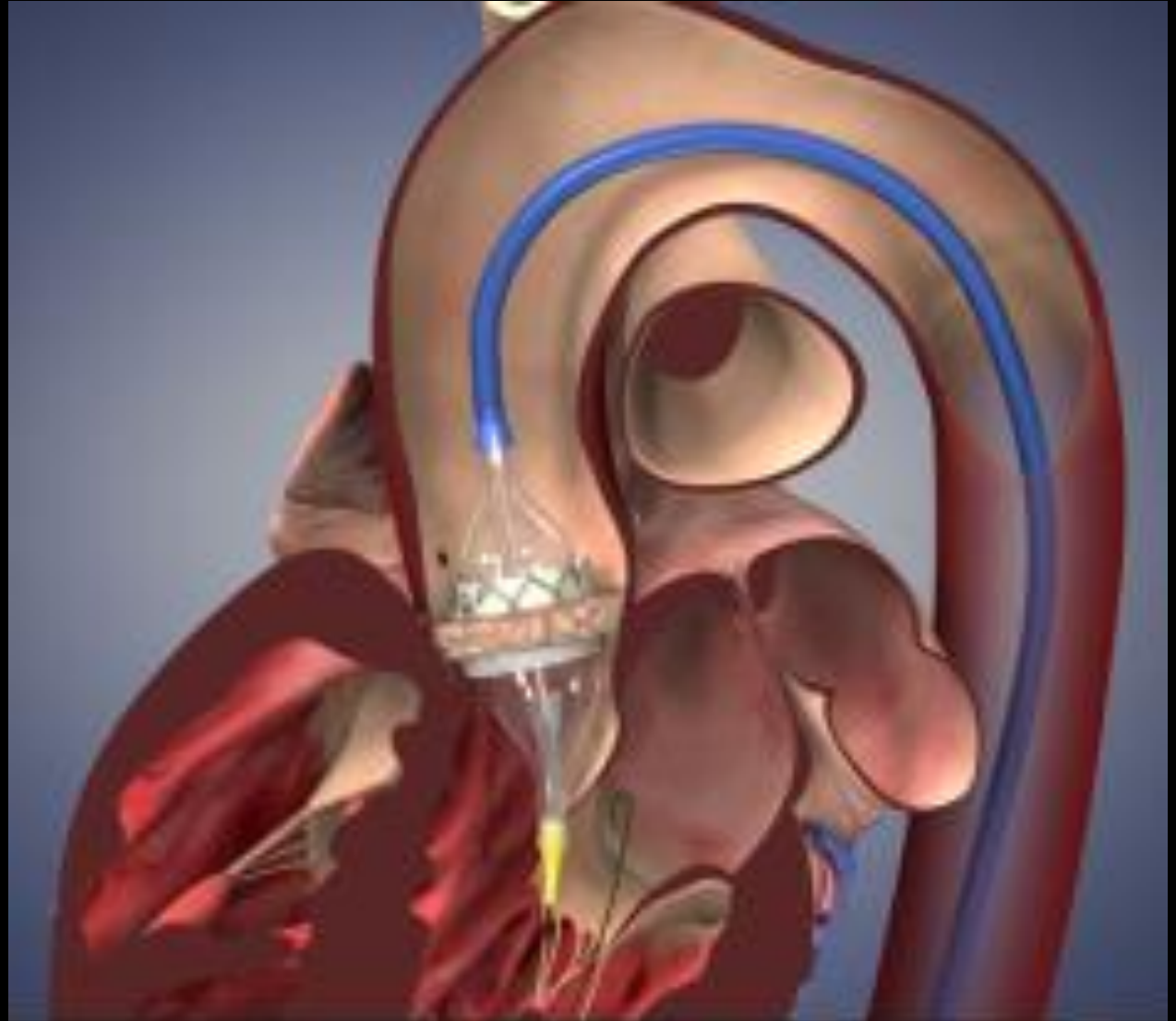
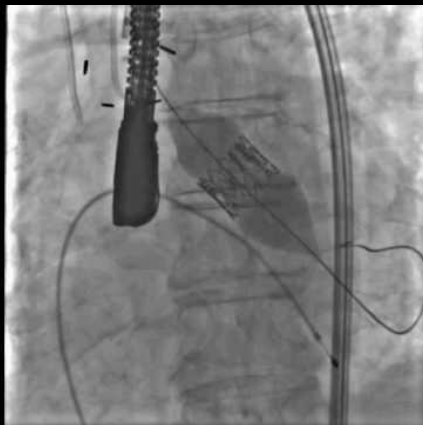
Cath Lab Nursing
CCU/N6 Nursing Teams
Wilma Castaneda
Ryan O'Kelly
Frank Polakovich (Abbott)

IHF Domain 2: Valvular Heart Disease

85 year old with inoperable Aortic Valve Stenosis
Advanced HF → Cardiac Surgery → Interventional



Andrew Weintraub, MD



IHF Domain 3: Holes in the Heart

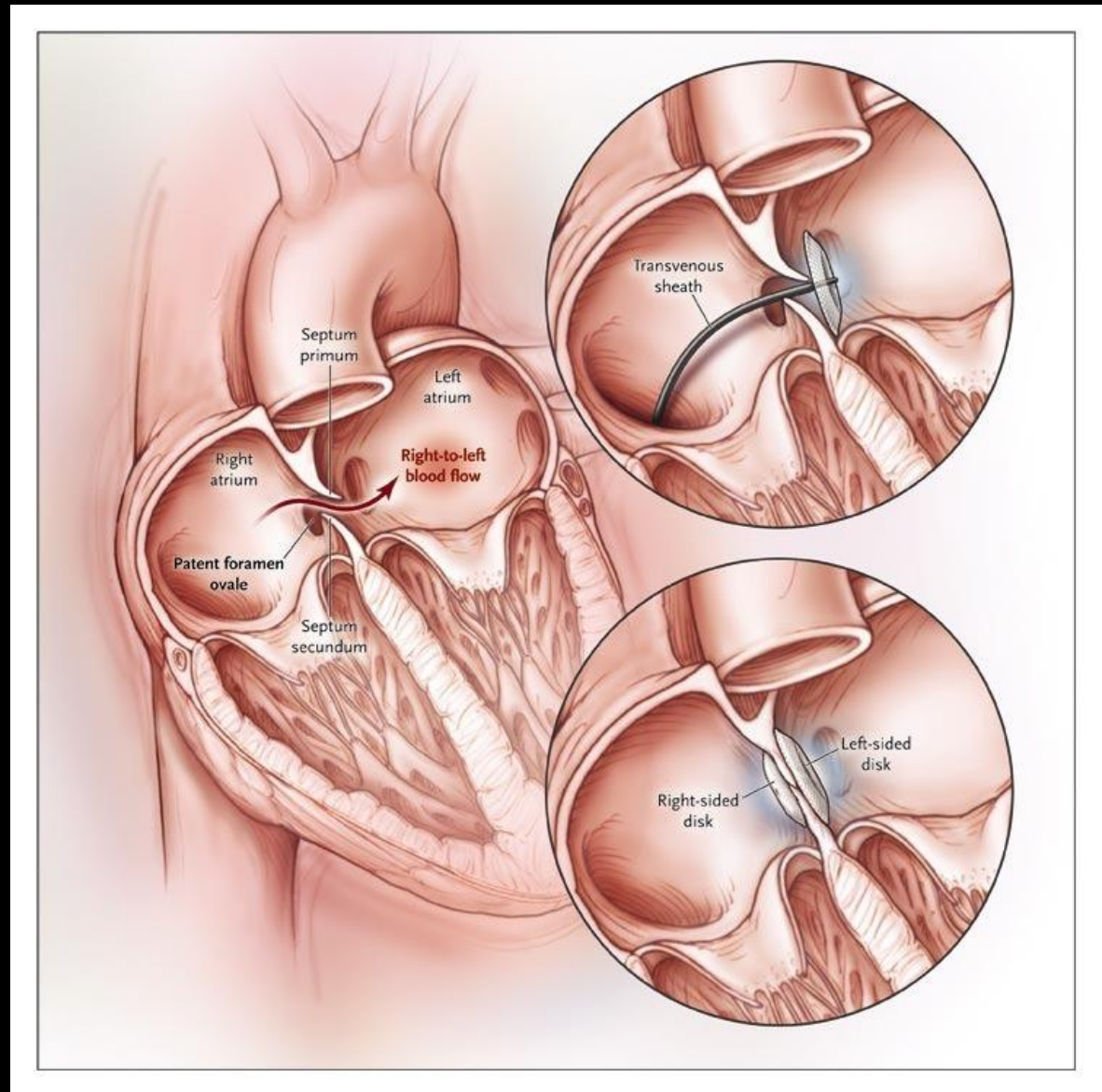
Closing holes in the heart to reduce stroke risk



Carey Kimmelstiel, MD



David Thaler, MD



IHF Domain 3: Holes in the Heart

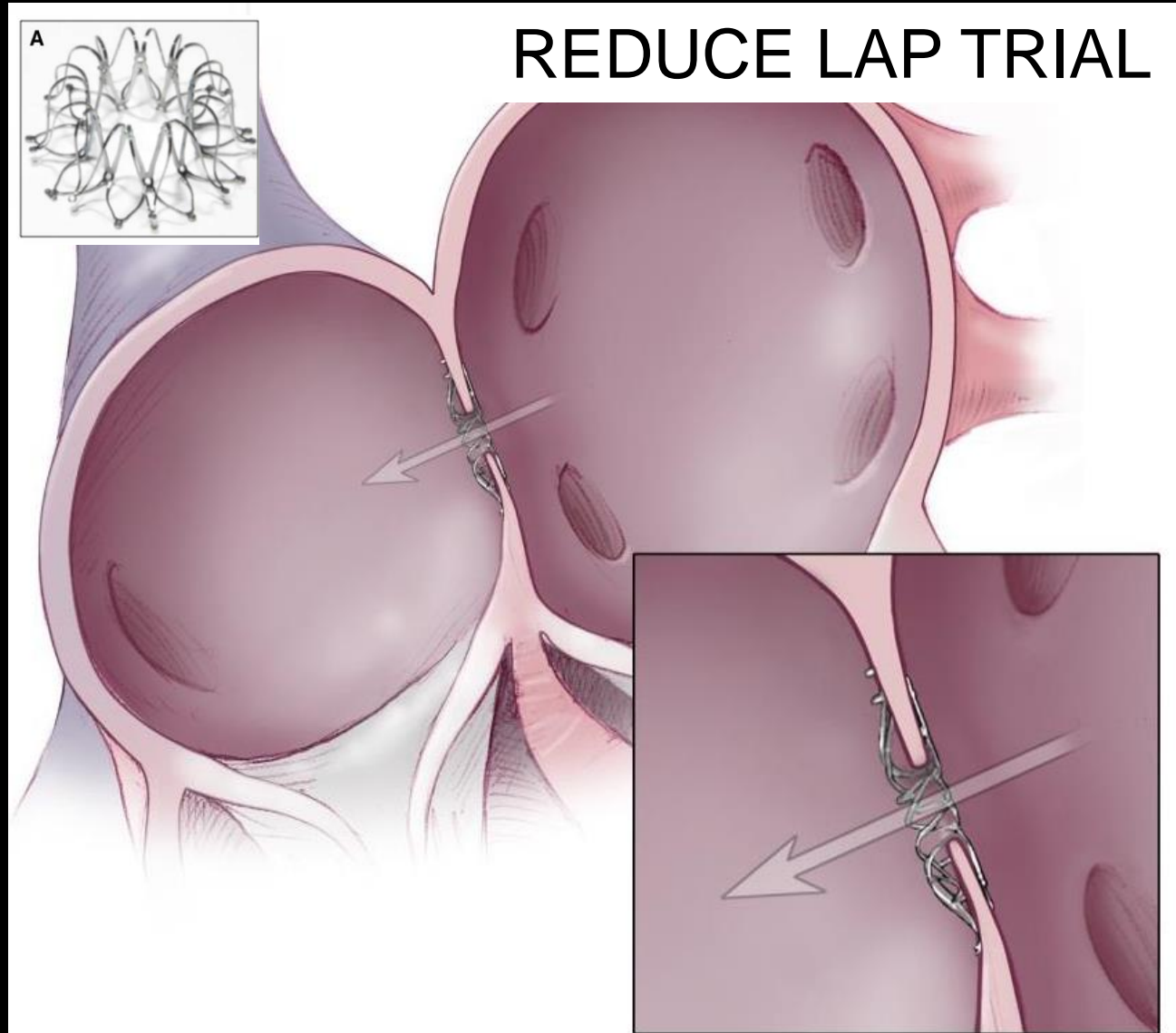
Opening holes to reduce symptoms of heart failure



Carey Kimmelstiel, MD

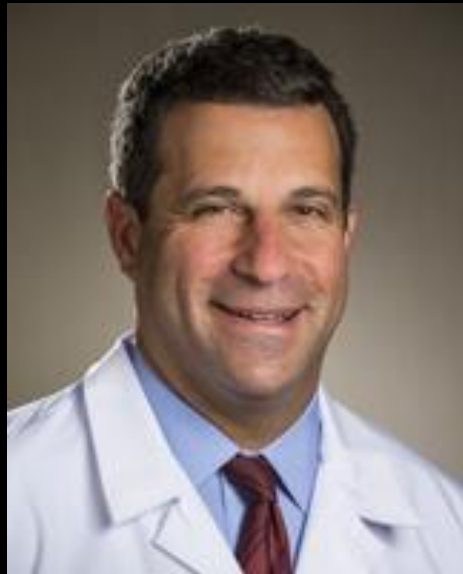


Amanda Vest, MD

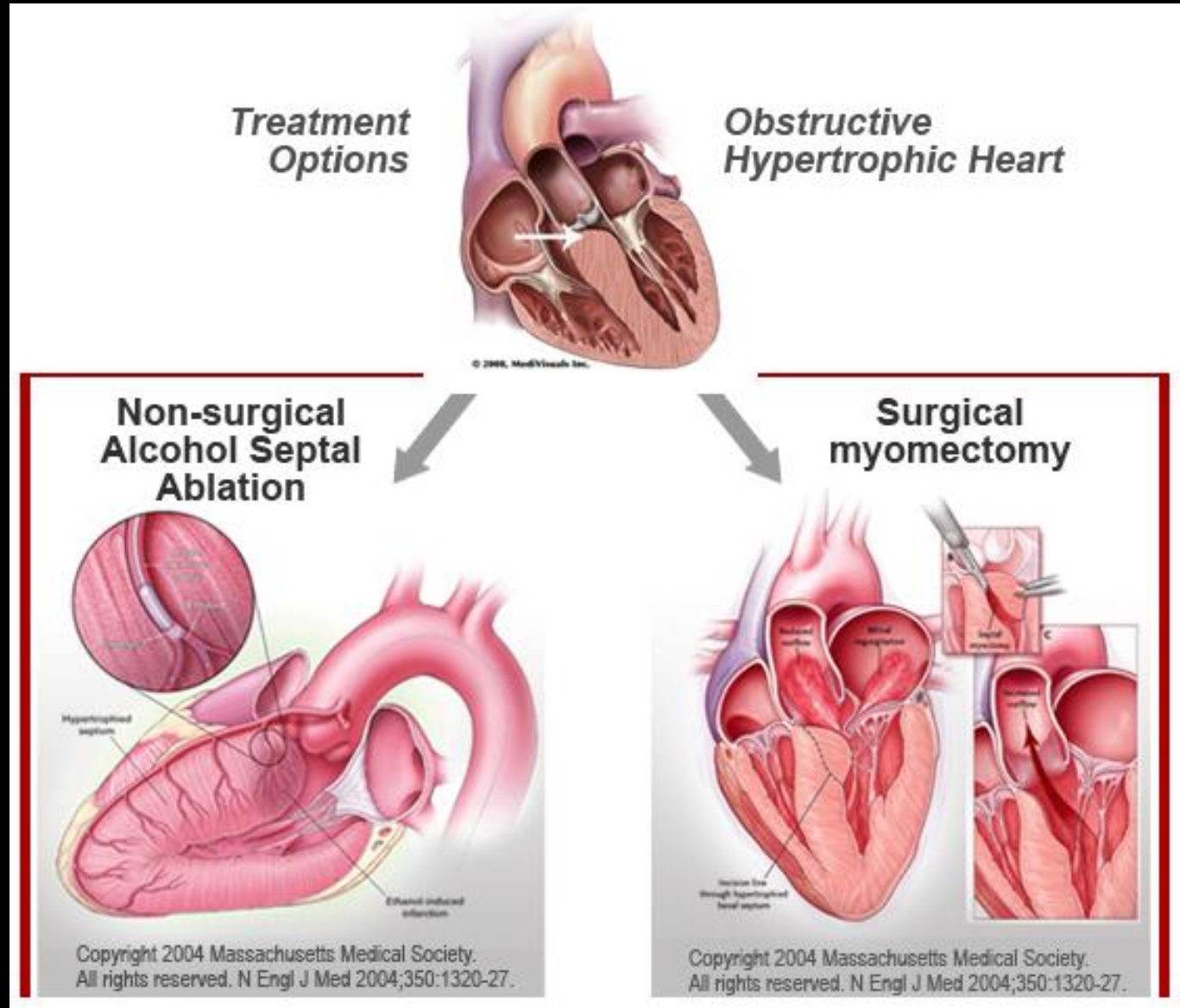


IHF Domain 4: Hypertrophic Cardiomyopathy

Tufts is the Largest HCM Program in the United States



Martin Maron, MD



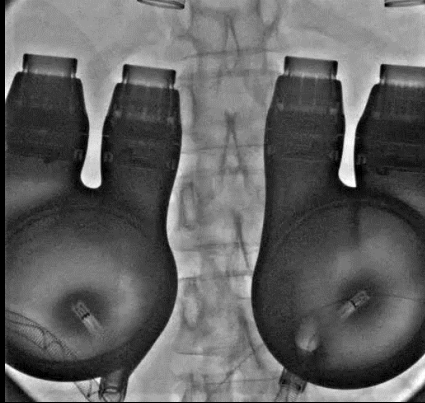
IHF Domain 5: Mechanical Circulatory Support

2007



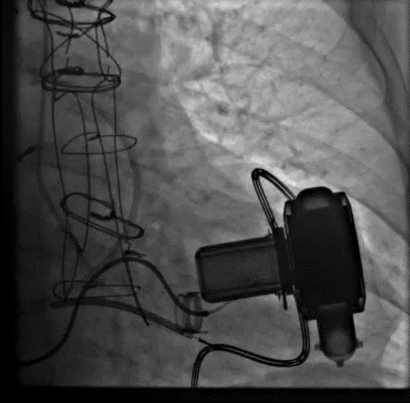
2017

Lossy compression - not intended for diagnosis



IVADs

Lossy compression - not intended for diagnosis



HVAD

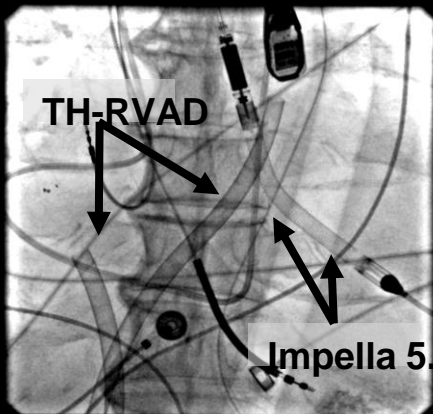
Lossy compression - not intended for diagnosis



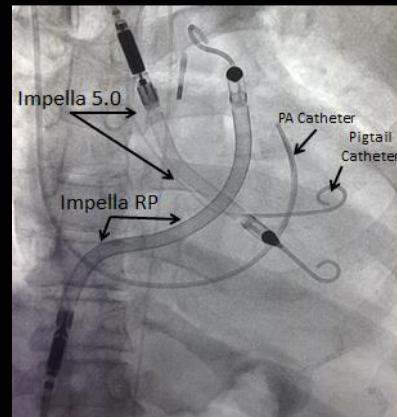
Impella CP



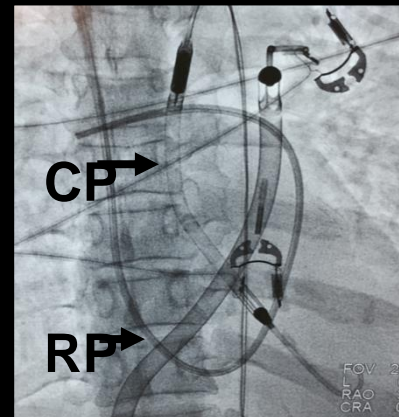
5.0 as a Bridge to Recovery



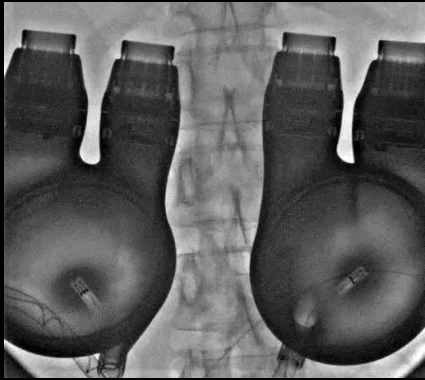
TH + 5.0



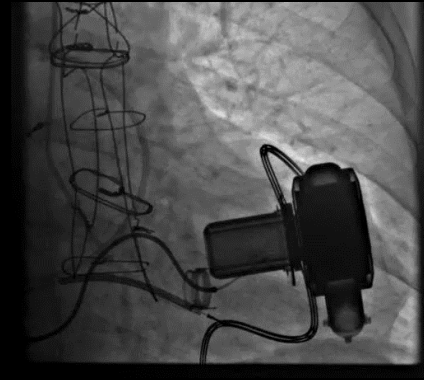
BiPellas



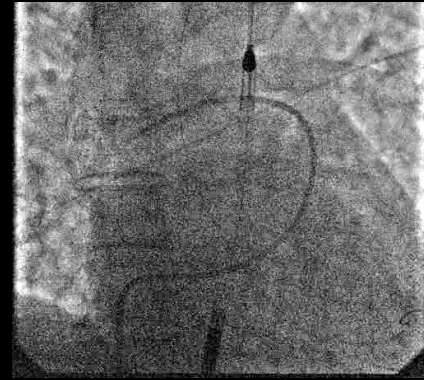
IHF Domain 5: Mechanical Circulatory Support



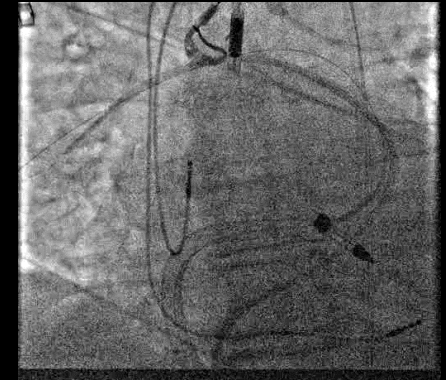
Bi-VADs



HVAD



Impella CP



Bi-Pellas



Cardiac Replacement



Cardiac Recovery

Delivering patients back to their lives and our neighborhoods

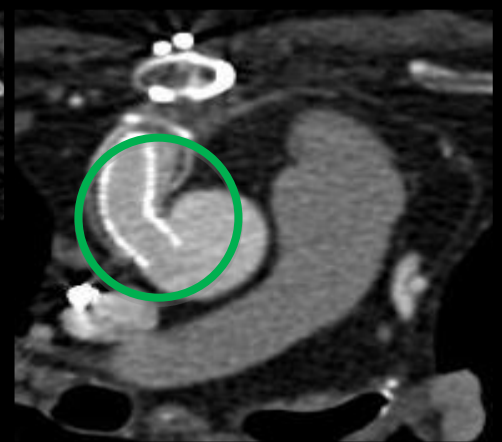
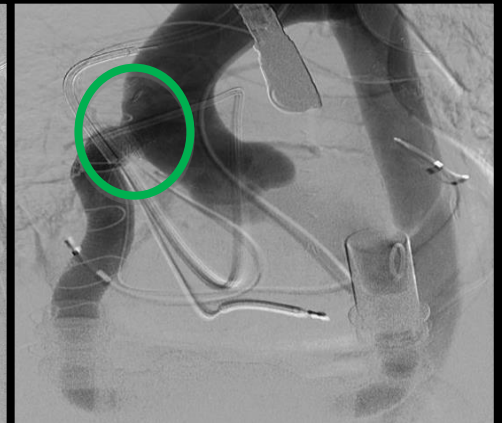
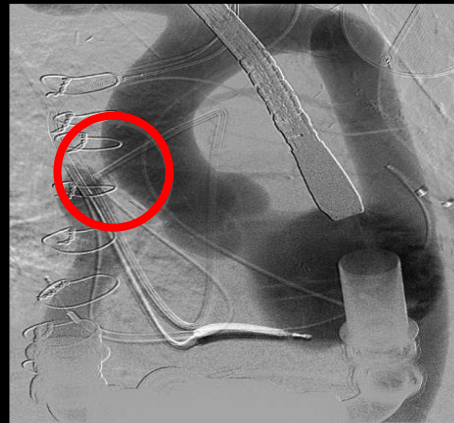
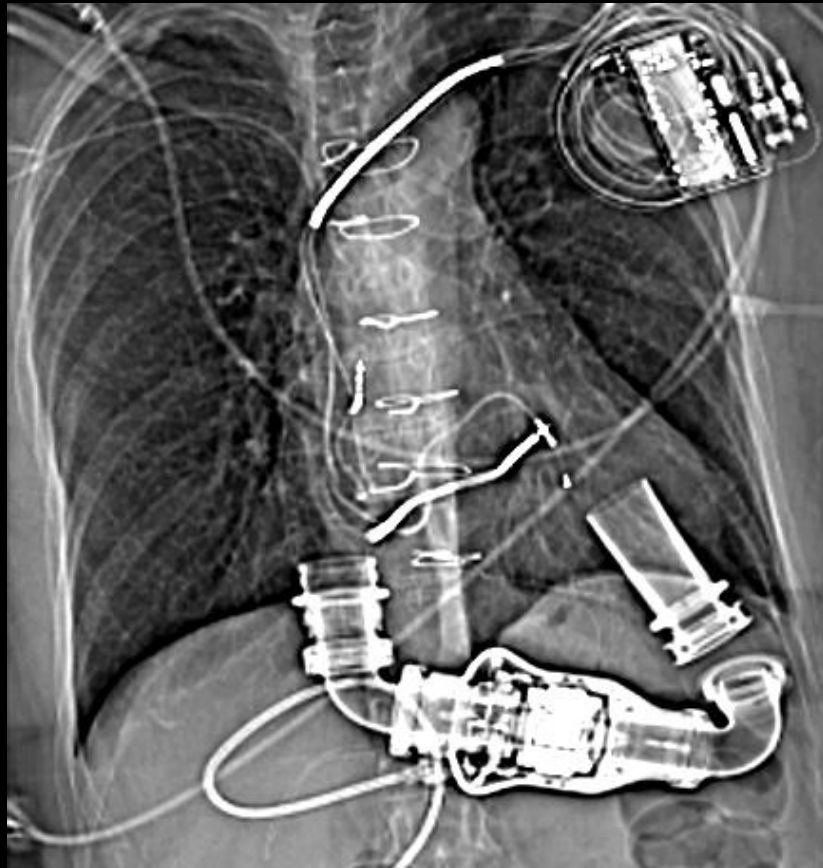


Greg Derr/The Patriot Ledger | 

Kevin Duperre, 45, who survived a heart attack is glad for all the trained medical professionals which will allow his a great fathers day with his kids, Jack,7 and Amanda, 10. His wife Kristen is also 45. The family is seen at their Pembroke home.

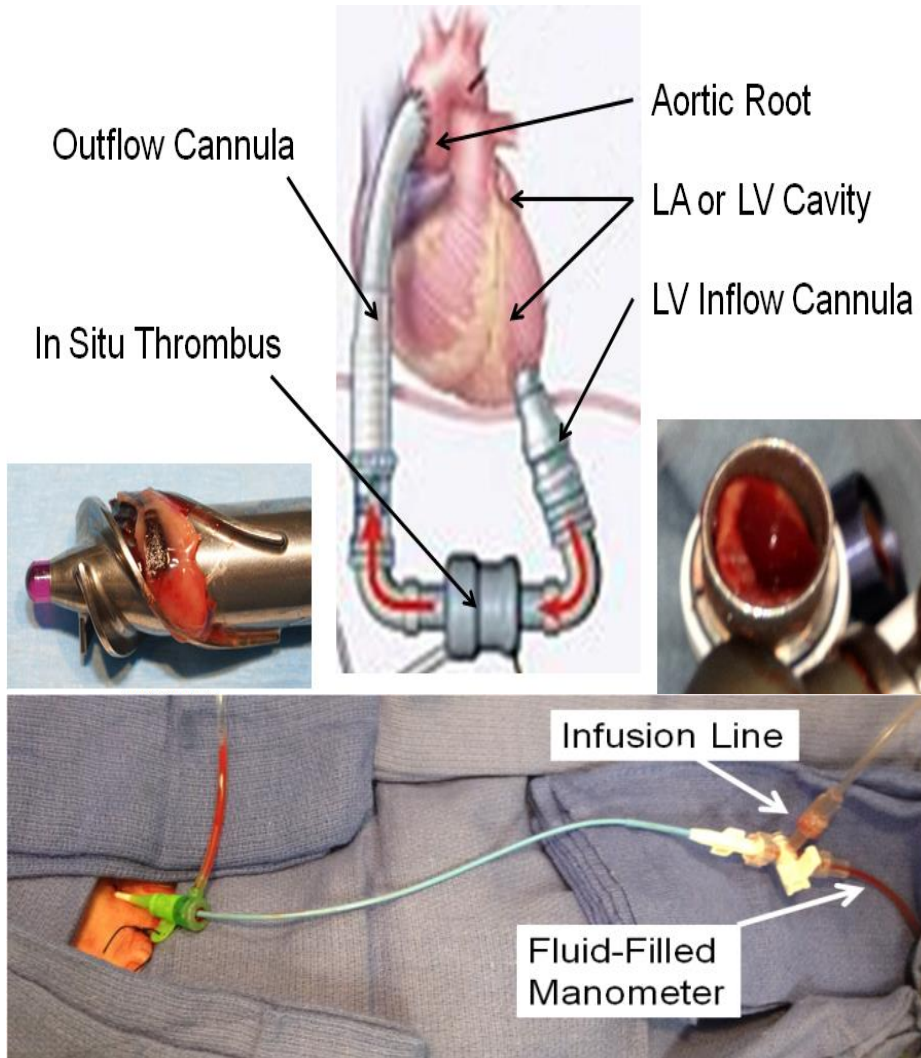
IHF Domain 6: Mechanical Circulatory Support

Catheter-based Approaches for LVAD Failure

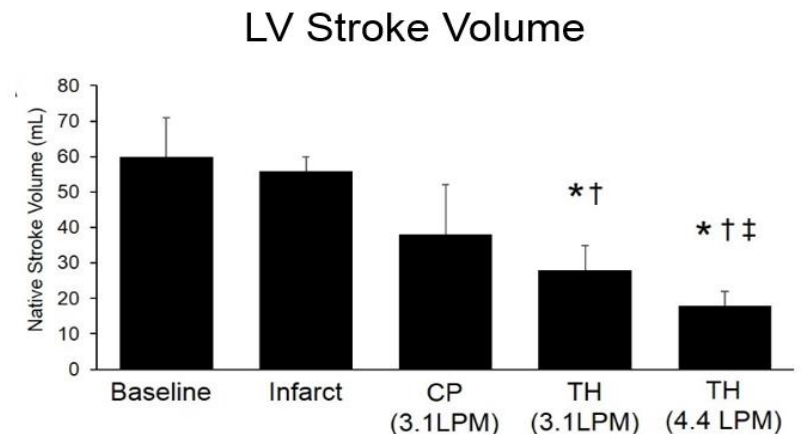
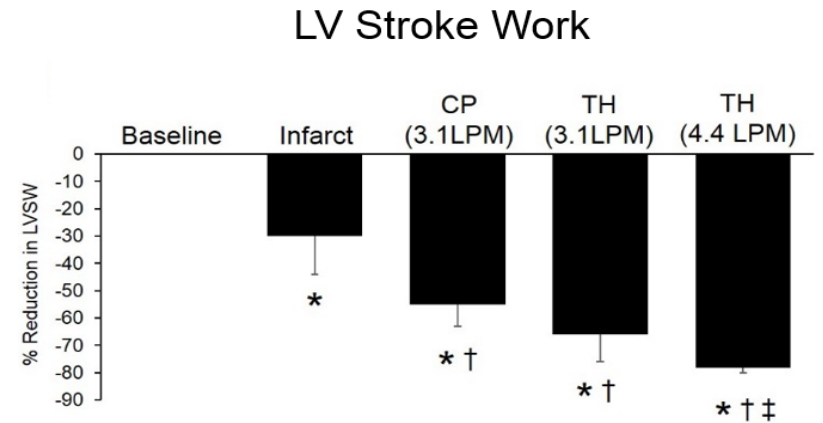
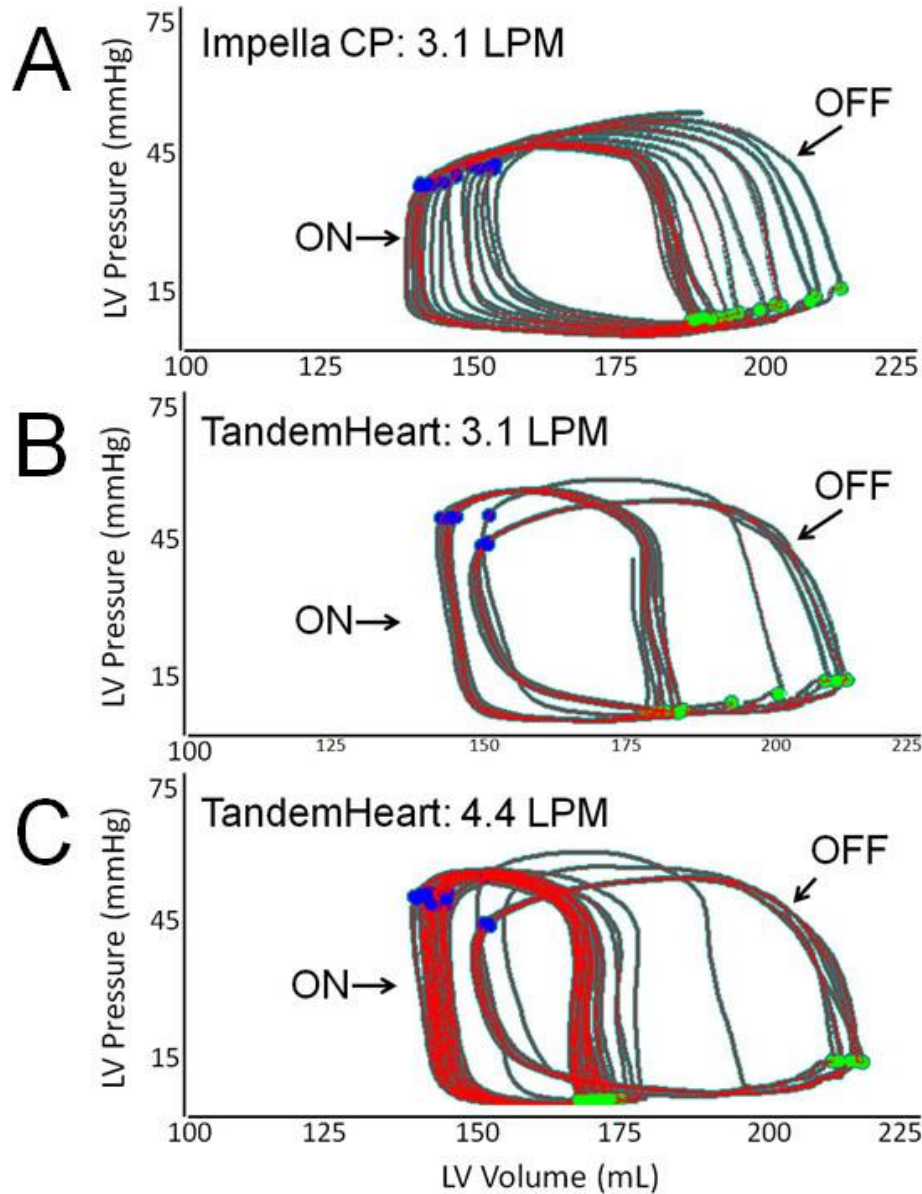


IHF Domain 6: Mechanical Circulatory Support

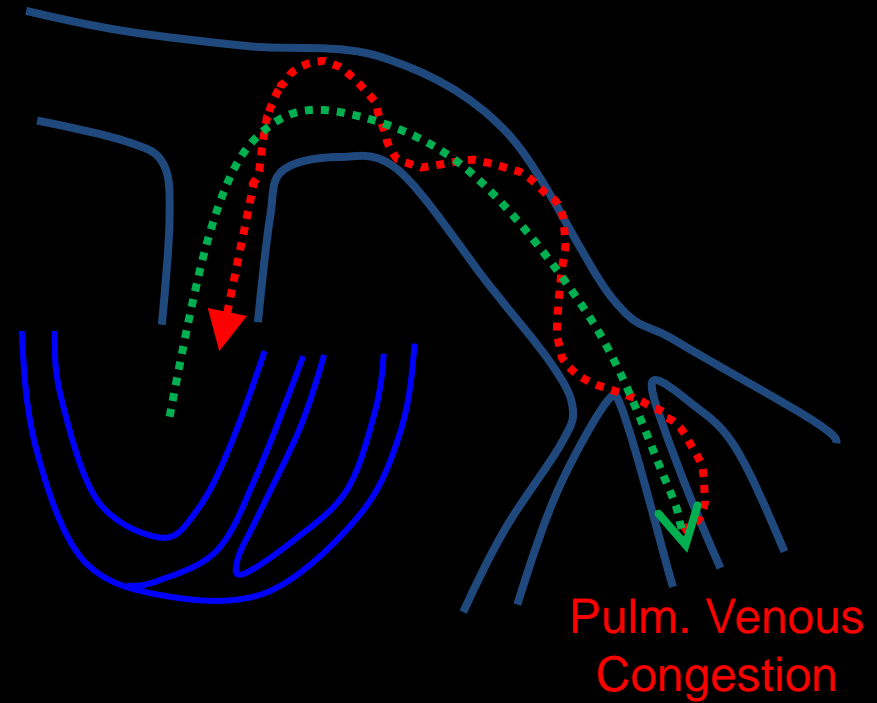
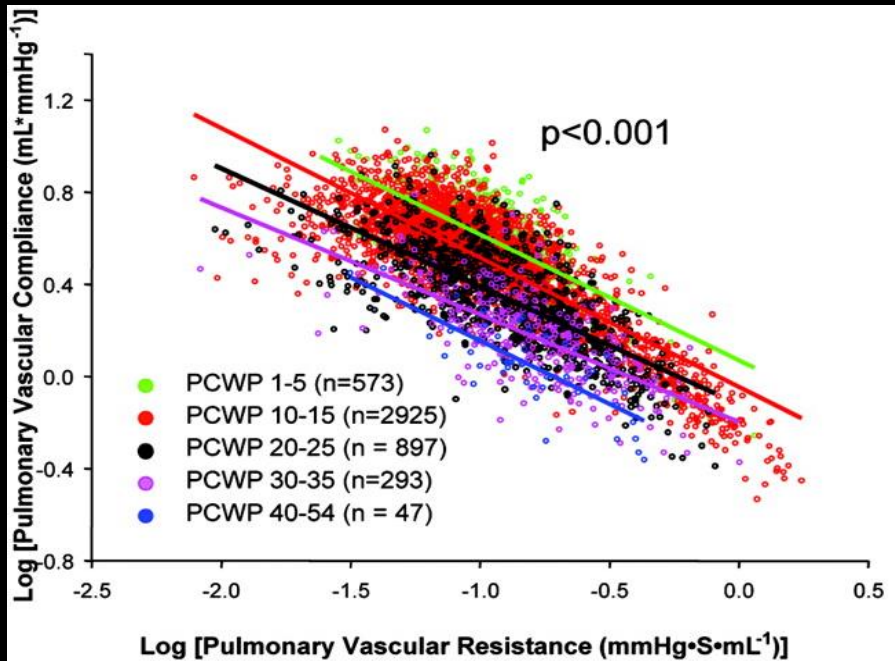
Catheter-based Approaches for LVAD Failure



IHF Domain 7: Advanced Hemodynamics



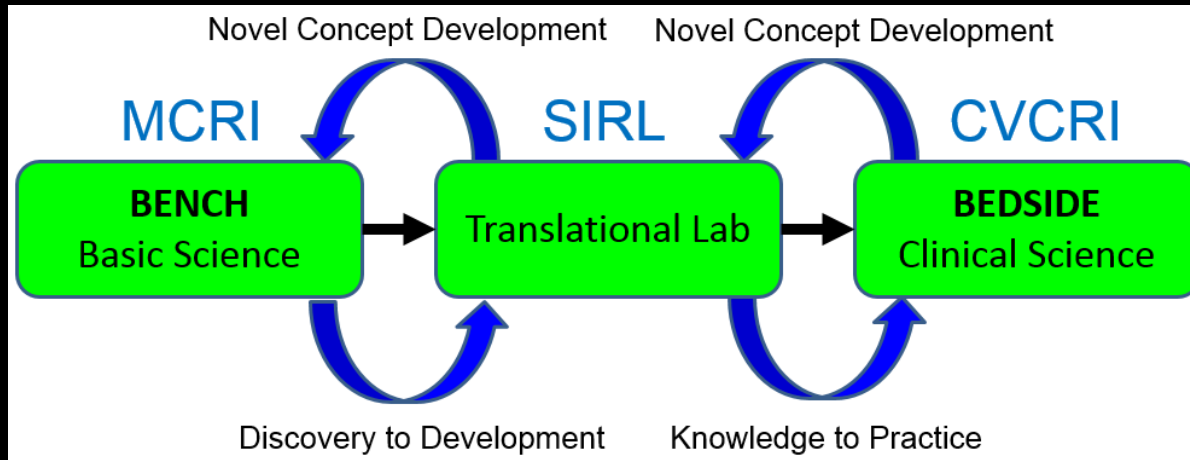
IHF Domain 7: Advanced Hemodynamics



$$\uparrow \text{PCWP} \rightarrow \frac{\downarrow \text{PA Compliance}}{\uparrow \text{PA Resistance}}$$

$$\downarrow \text{PAPi} = \frac{\downarrow \text{PA Pulse Pressure}}{\uparrow \text{Right Atrial Pressure}}$$

IHF Domain 8: Translational Research

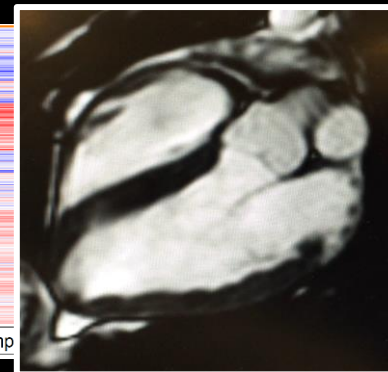
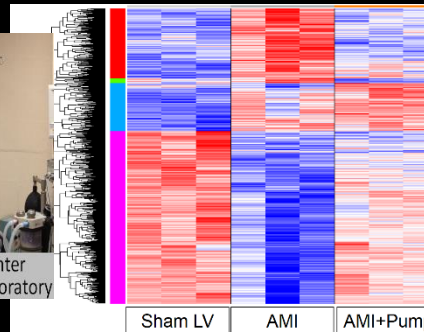


Boston
2015

Paris

Rome

Barcelona
→ 2017



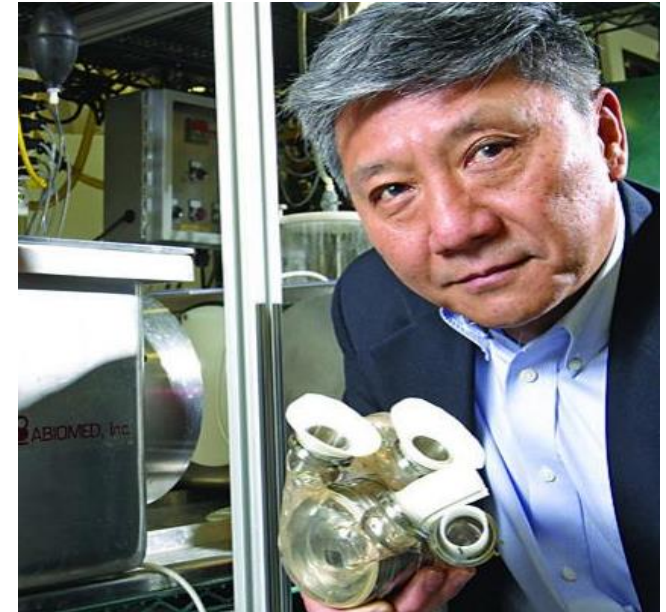
Clinical Excellence → Preclinical Testing → Fundamental Discoveries → Preclinical DTU Trial → Clinical DTU Trial Launch

The Robert TV Kung Interventional HF Program

Training the Next Generation of IHF Leaders at Tufts MC

Improving Quantity and Quality of Life

<p><u>Coronary</u> Multivessel PCI Complex PCI CTO</p>	<p><u>Myocardial Failure</u> Volume Reduction Ventricular Shaping</p>	<p><u>Valvular</u> TAVR Functional MR Organic MR</p>
<p><u>Right Heart Failure</u> Congenital Therapy 1^o or 2^o Pulm H TN Circulatory Support</p>	<p><u>Circulatory Support</u> Acute MI & Shock High Risk PCI Heart Failure</p>	<p><u>Molecular Targets</u> Cytotherapeutics Biomaterials</p>
<p>Device Innovation: Coronary and Structural</p>		
<p>Invasive Hemodynamics (Basic and Advanced)</p>		



General Cardiology Training

Years 1 - 3

Advanced Heart Failure

Year 4

Interventional Cardiology

Year 5

* Funding provided for an ACGME Adv HF Fellow and a Research Fellow per academic year

The Robert TV Kung Interventional HF Program Training the Next Generation of IHF Leaders at Tufts MC

Mission Statement:

To advance the training mission of the CVC by providing **interventional cardiology** fellows with an opportunity to train in **advanced heart failure and cardiac transplant medicine**, thereby combining technical and cognitive skills to optimize patient care and generate new approaches to clinical research, innovation, and education.

Tufts Medical
Center
The CardioVascular Center

 **ABIOMED**
Recovering hearts. Saving lives.

The Robert TV Kung Interventional HF Program

Training the Next Generation of IHF Leaders at Tufts MC



Kung Clinical Fellow (2019)



Kung Clinical Fellow (2020)



Kung Research Fellow (2019)

Tufts Medical
Center
The CardioVascular Center

 **ABIOMED**
Recovering hearts. Saving lives.