

# Training in EP: Changes in the specialty and the skill set and toolbox needed to be a great EP in 2014

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Honoraria for consulting / lecturing: Biosense Webster, St. Jude Medical, Medtronic, Boston Scientific, Biotronik



# When I was a fellow...

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- The majority of my procedures were tests of drug efficacy for VT
- CIED implantation was performed by surgeons
- Simple ablations were performed (by attendings)
- We were encouraged to learn a single skill very well
- EP practice patterns were just starting to evolve (we didn't talk to anyone, no one talked to us)
- The practice of EP is vibrant, and hopefully will continue to evolve rapidly. How will you adapt?

# Multitasking



Search ID: ksmn3846

"... Well, I wouldn't call eating, drinking and watching the telly at the same time, multitasking!"

# Communication

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- The EP lab is no longer like the oracle at Delphi!
- Fortunately, or unfortunately lots of people are now interested in what is happening in the EP lab!
- Practice building (even in academic practice)
- Team building
- Negotiating with hospital administrators
- Networking with professional societies

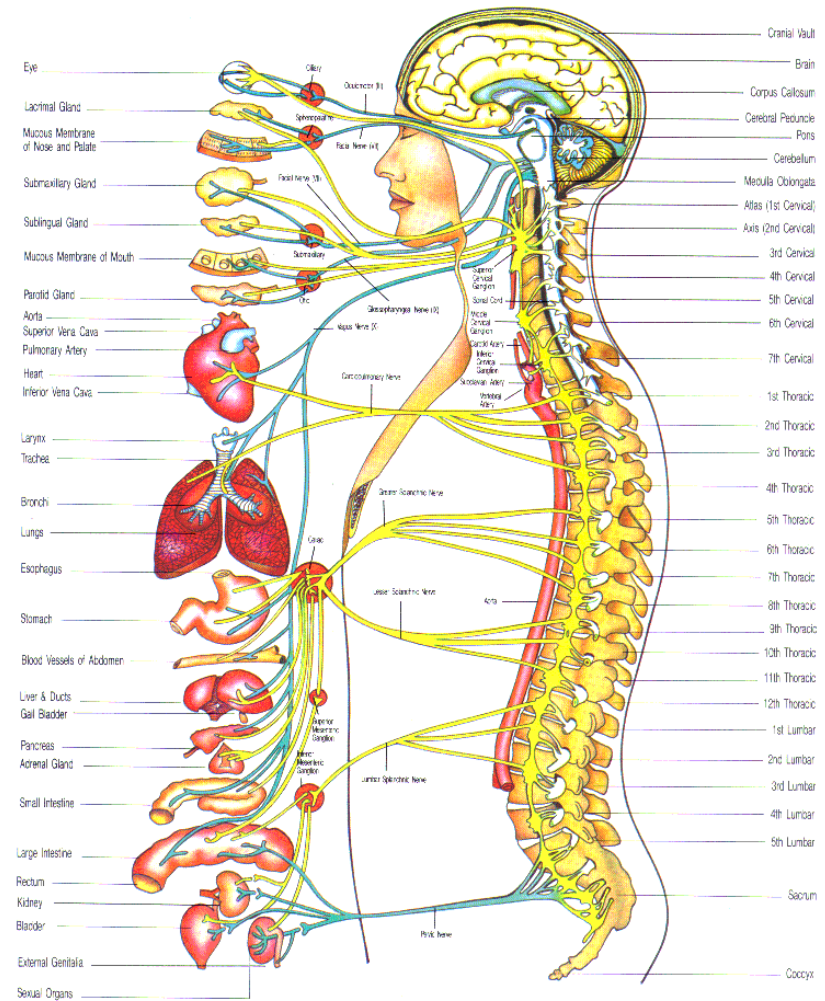
# New necessary skills for the near term

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- Understanding of autonomic nervous system physiology
- Interventional cardiology
- Advanced imaging
- Continued (ever expanding) need for critical analysis of new procedures and techniques
- In addition, it is increasingly difficult to learn new skills outside of fellowship

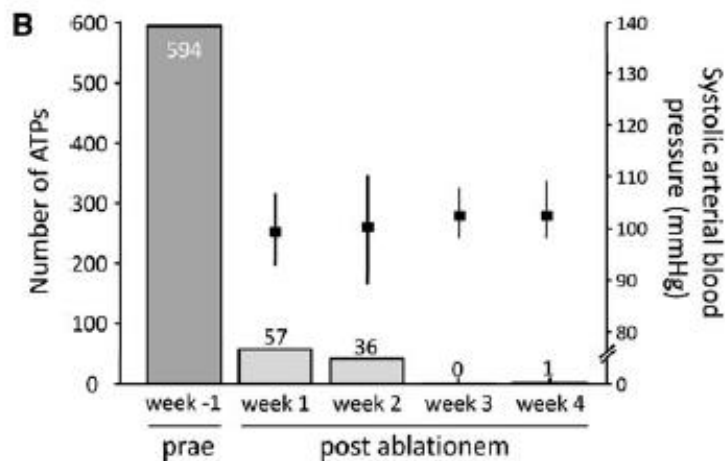
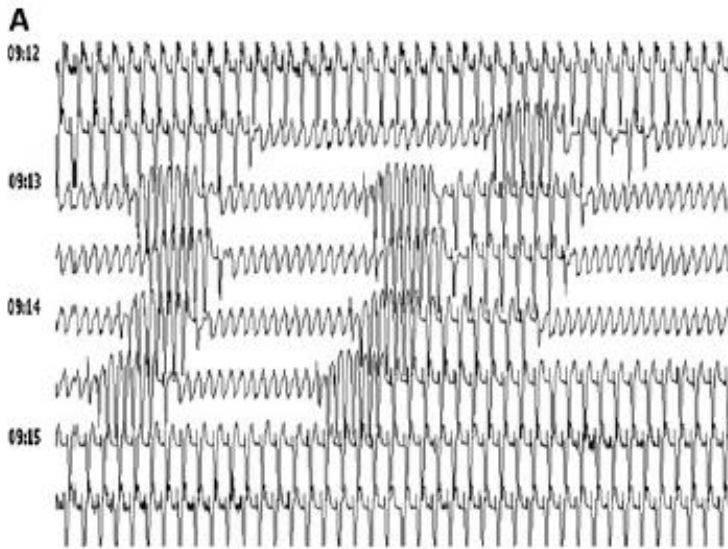
# Autonomic nervous system physiology

- Simplicity aside...
- Vagal stimulation for treatment of HF and SCD
- Neuraxial modulation for treatment of VT/VF storm
- Renal artery denervation for AF, VT



**AUTONOMIC NERVOUS SYSTEM**  
Sympathetic — Yellow Parasympathetic — Green

# Renal denervation in VT storm



- 2 patients with class III HF (HCM with VT storm despite catheter ablation, DCM with polymorphic VT)
- bilateral renal denervation as experimental procedure
- marked reduction in VT episodes (immediate and delayed response) despite reduction in AAD
- Marginal BP pre-procedure

# Interventional cardiology skills

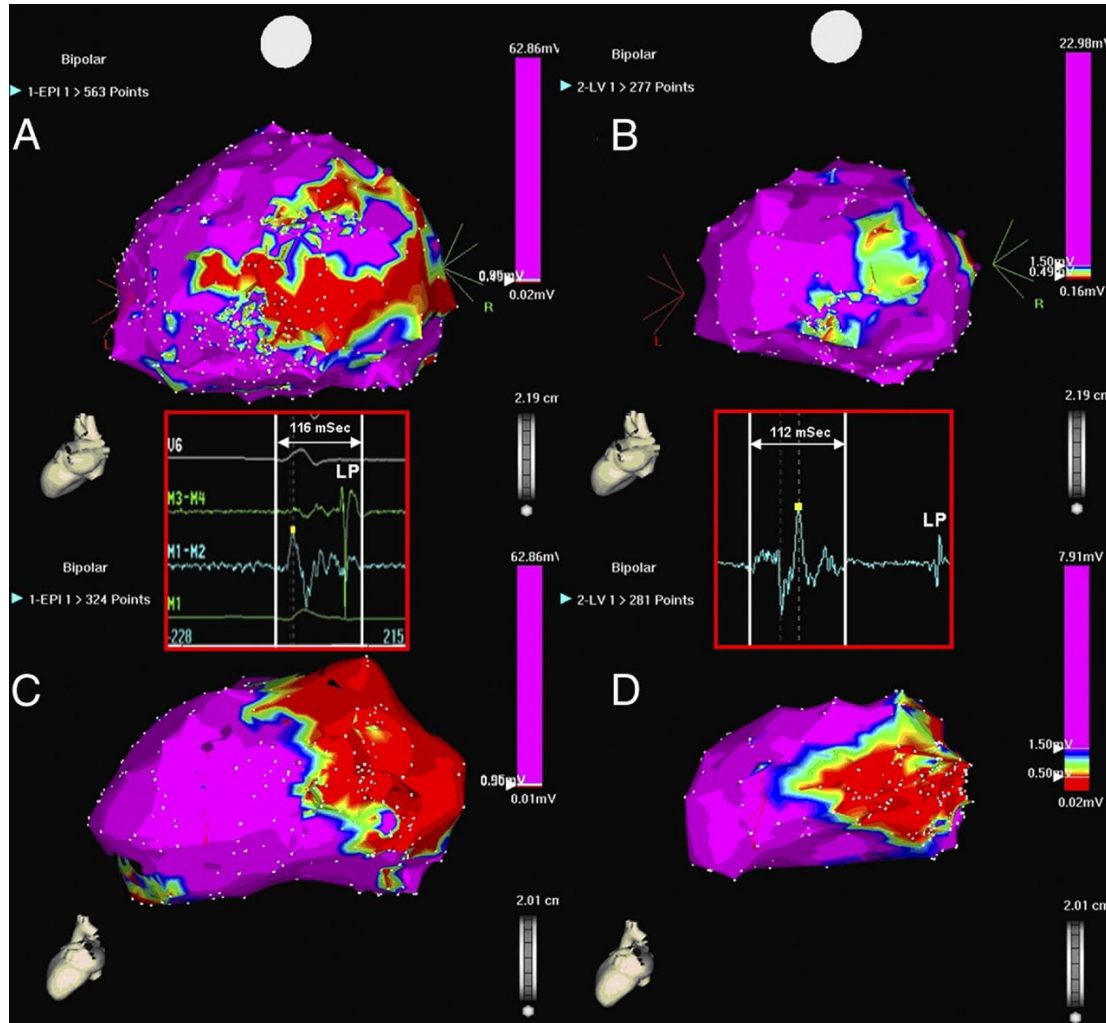
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- EPs are now arguably better at some skills traditionally “owned” by interventional cardiologists
  - transseptal catheterization
  - epicardial access
- Several new technologies (once proven/approved) might rightfully at least partially belong to electrophysiology



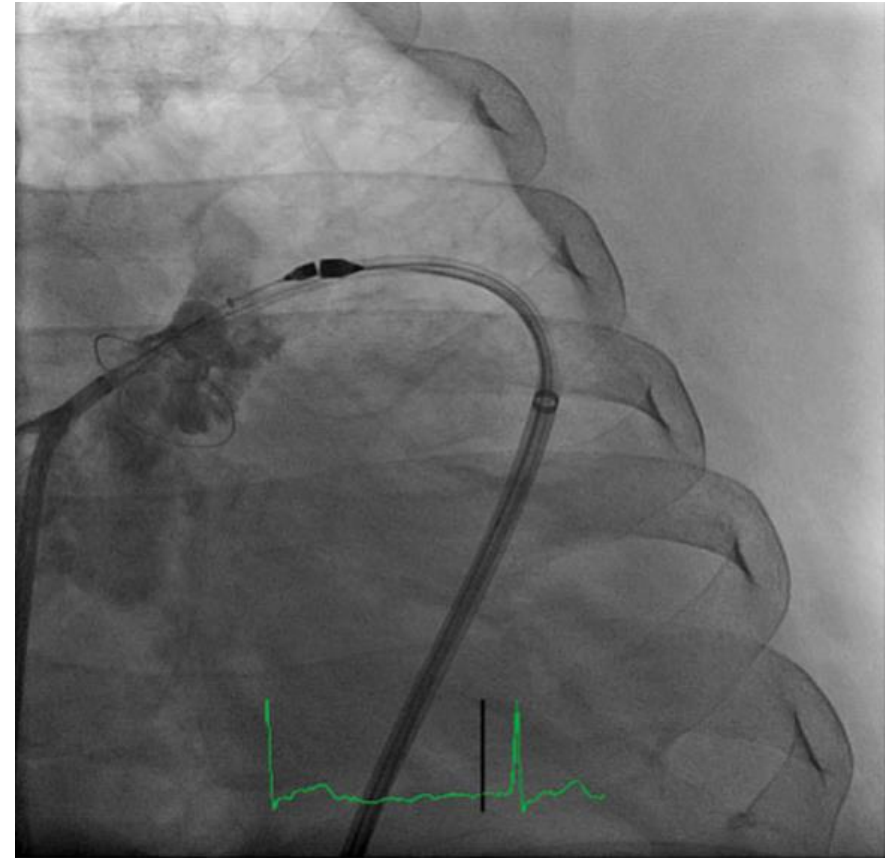
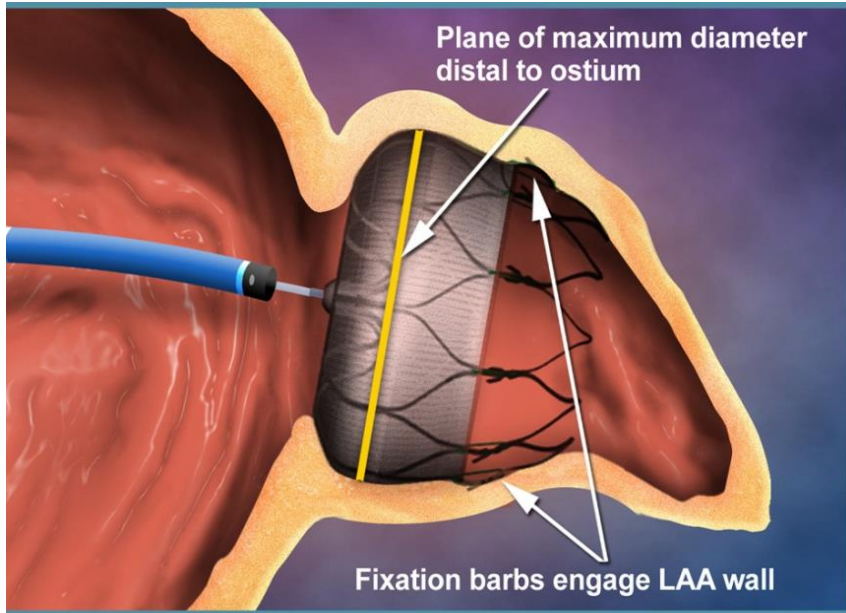
# Impact of epicardial substrate in NICM

endocardial



epicardial

# Left atrial appendage closure



# Advanced imaging skills

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Traditional EP procedures guided by fluoroscopy and electrograms

Fluoroscopic imaging is incredibly limited

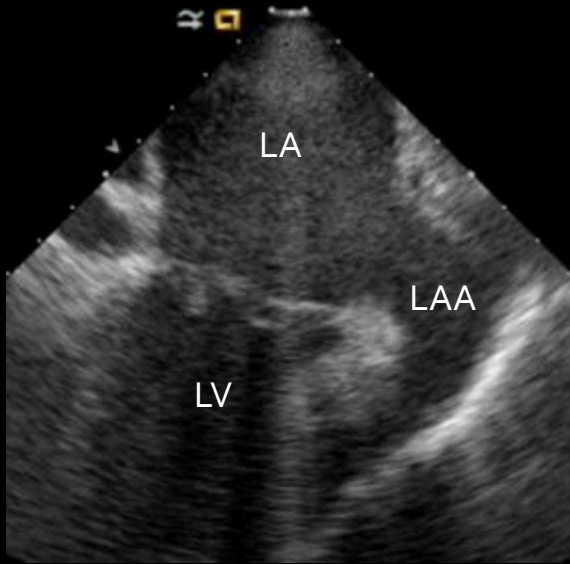
- Exposure to potential harmful ionizing radiation
- Unable to distinguish cardiac structures
- Unable to recognize extra-cardiac structures
- Cannot assess catheter contact
- Cannot assess lesion formation

Imaging to ground 3D mapping systems to real anatomy

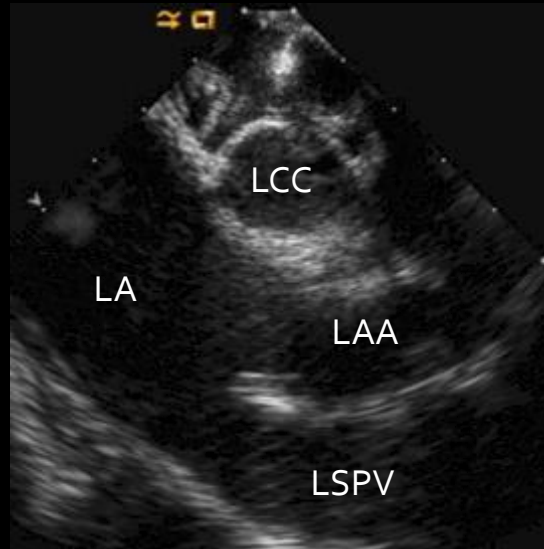
# Atrial septal aneurysm



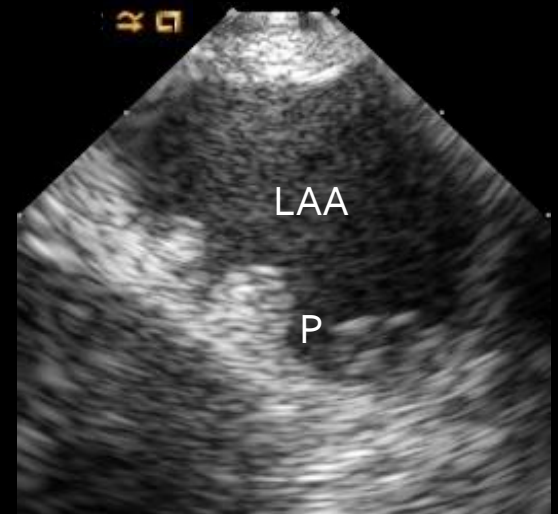
# LA Appendage Visualization



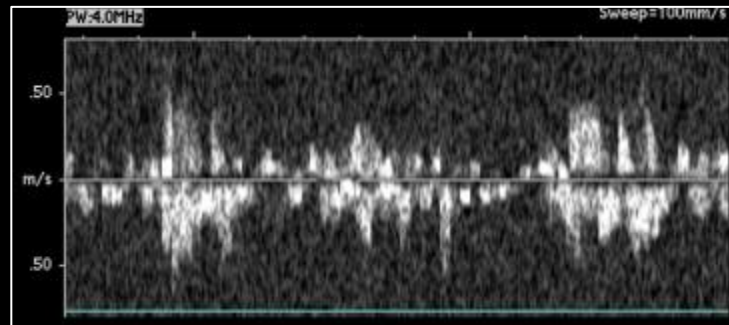
RA Transseptal View



RV Outflow View



Pulmonary Arterial View

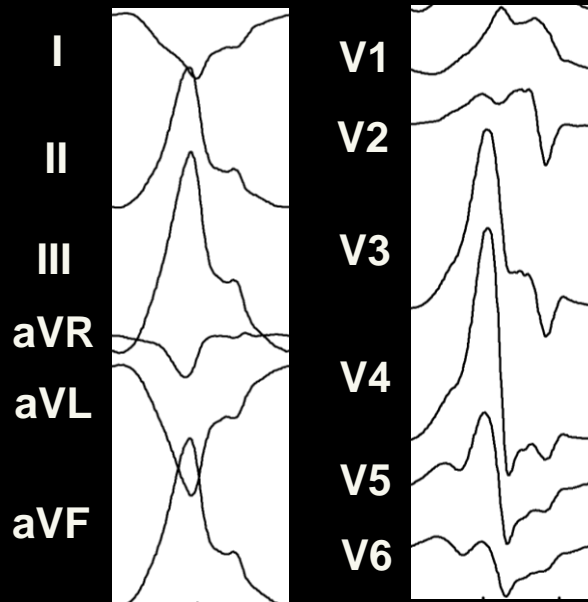


# Detection of effusion / tamponade

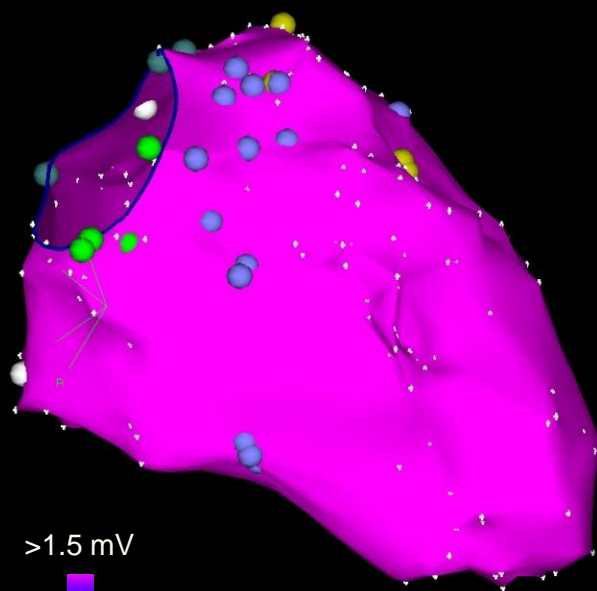
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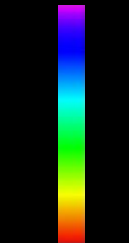
# 32M with normal TTE



RBRI 280ms

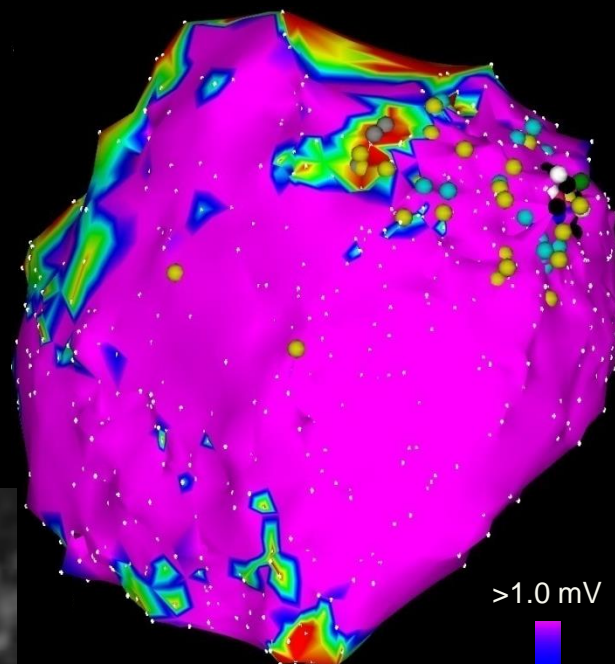


>1.5 mV

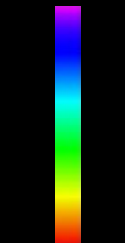


<0.5 mV

Base  
Apex  
RAO

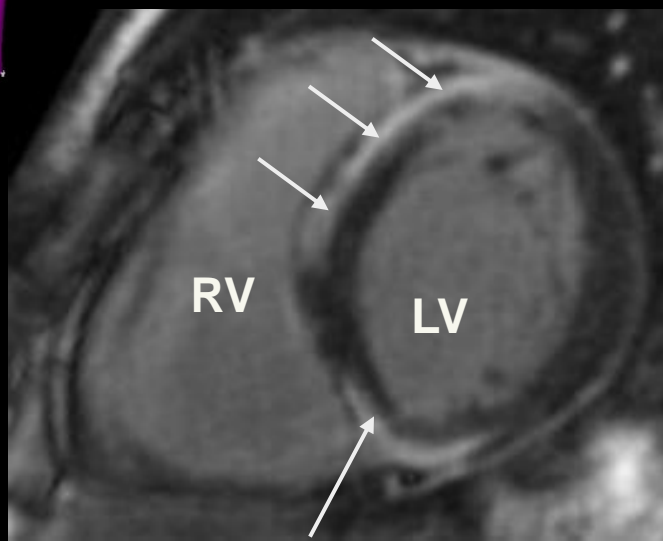


>1.0 mV



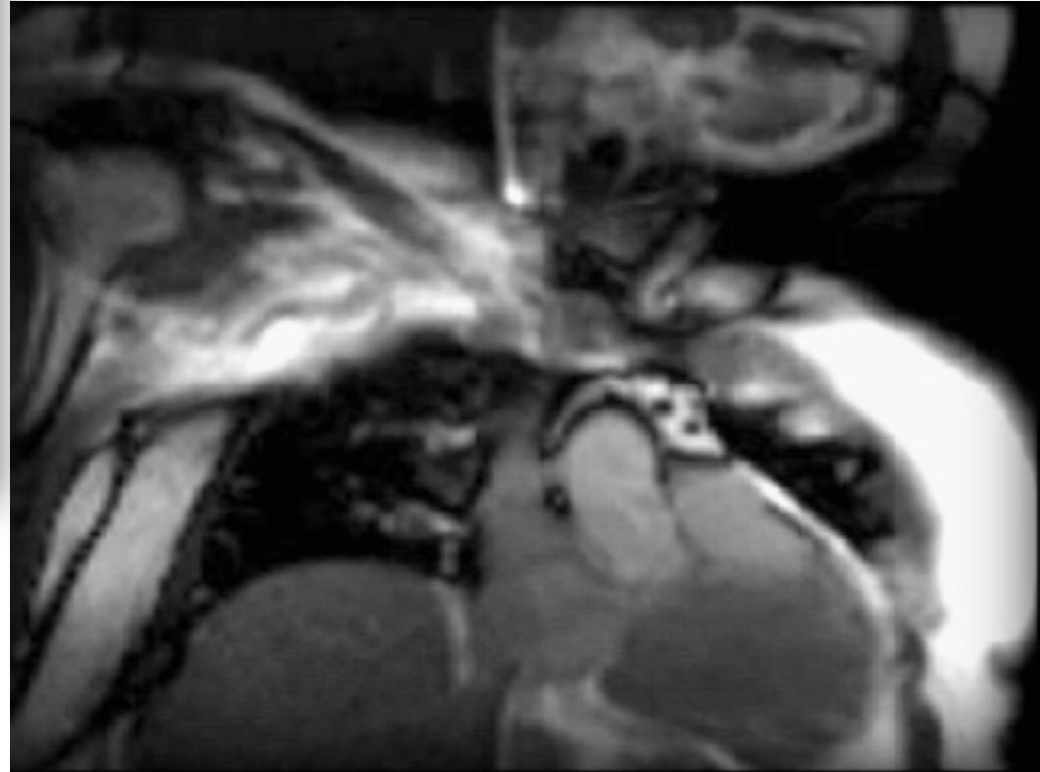
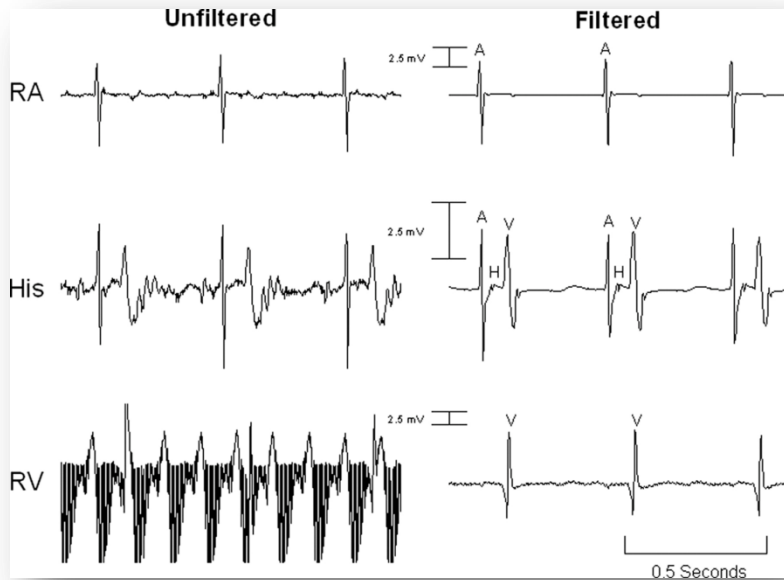
<0.5 mV

Base  
Apex  
LAO



Mid-myocardial delayed enhancement

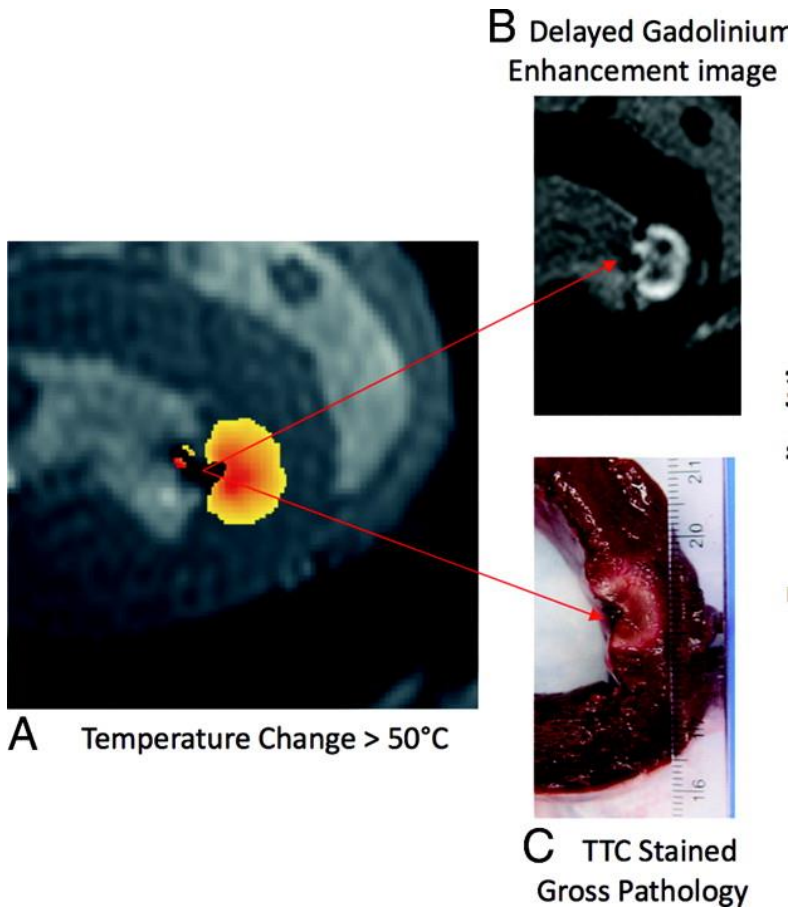
# Real-time MRI guidance in EP lab



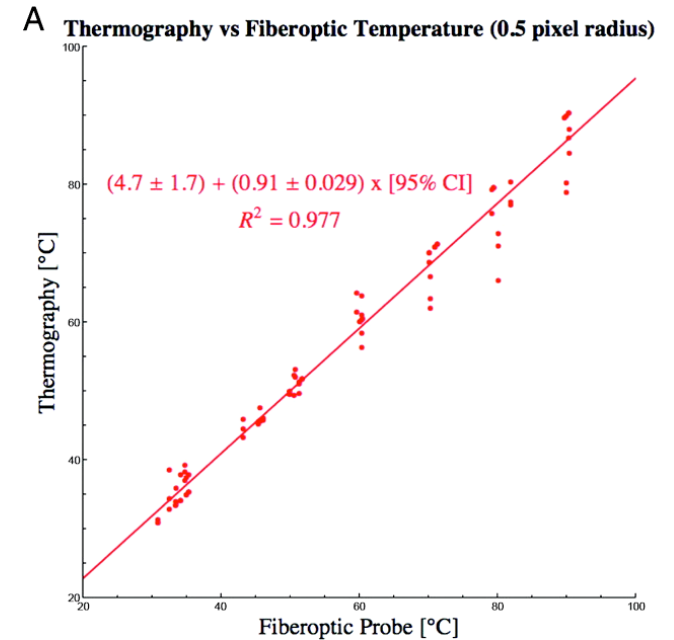
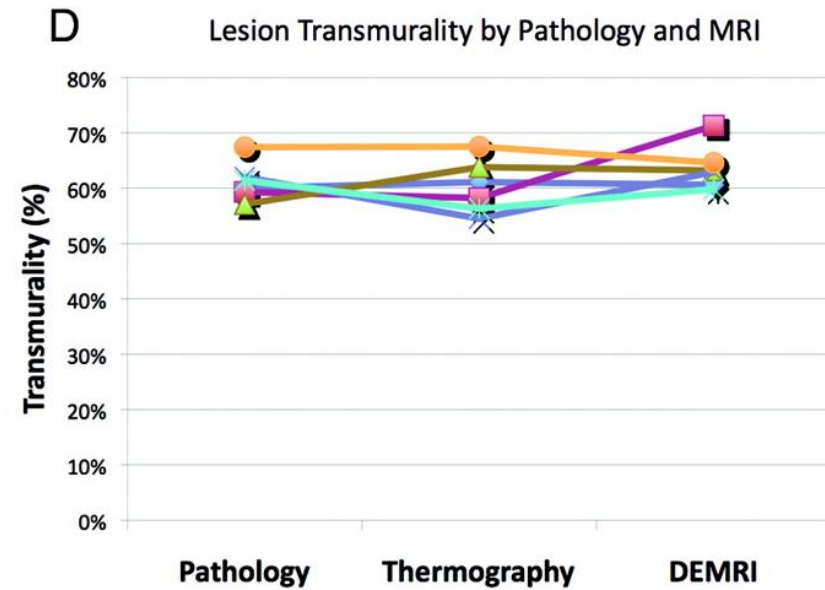
- ~5 frames/sec
- ~2°C inductive heating tip > ring
- Limited resolution



# MR Thermography

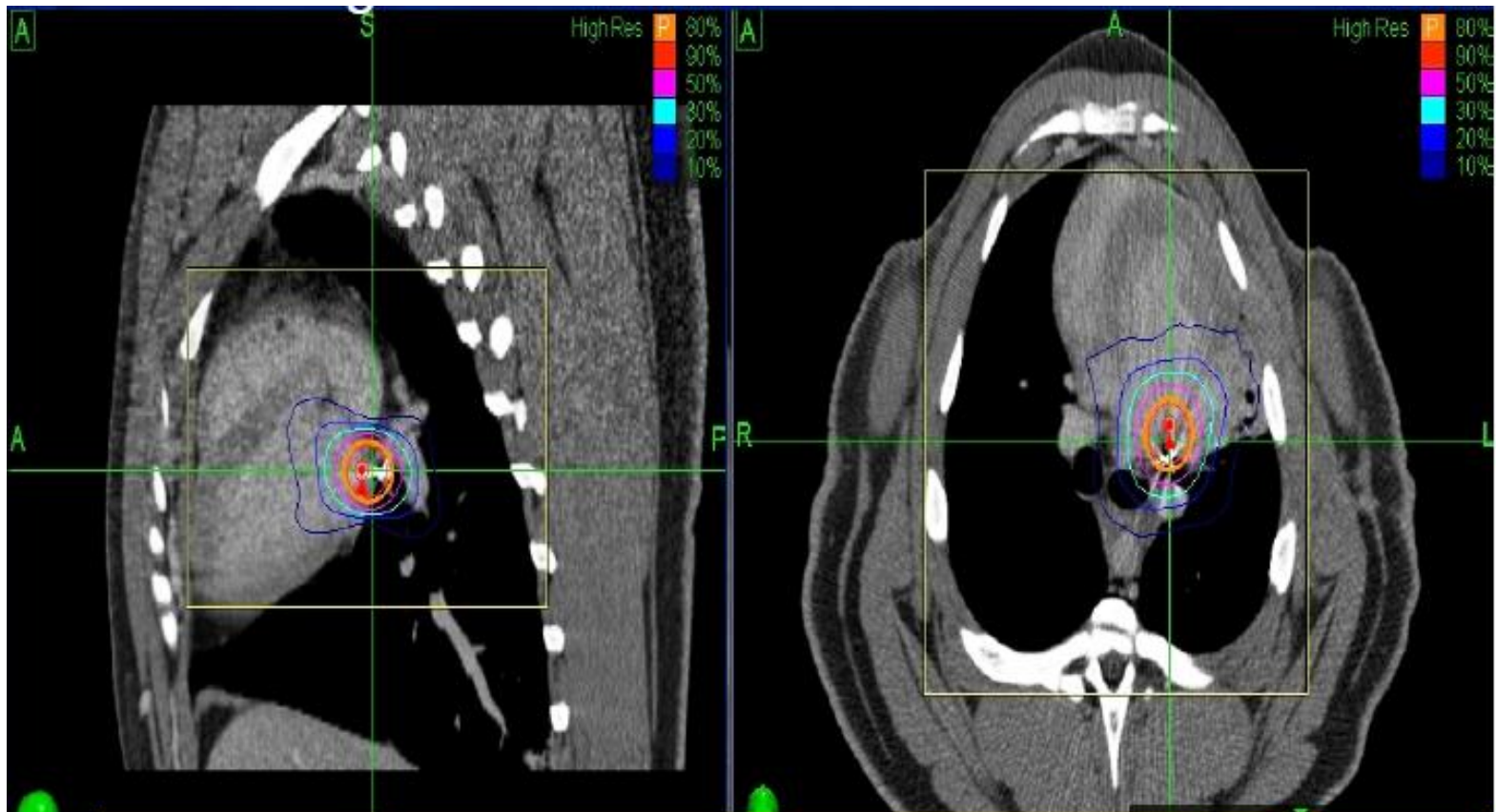


Proton resonance frequency shift thermography (PRFST)



# What about really new technologies?

## Proton beam therapy for AF ablation



Dose, or energy fall off, occurs rapidly, so only a discrete area is ablated

Courtesy of Doug Packer, MD

# Emerging technology

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- You have to make independent decisions about safety and efficacy of new procedures in your patients
- Will you be an early adapter?
- How much data will you require?
  - FDA approval
  - Use and validation by individuals you trust
- Learning new techniques / strategies outside of fellowship is difficult

# Words (of wisdom)

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Some advice that has not changed with passing time...

- Embrace technology, our field is critically dependent upon it
- Remain broad minded (multidisciplinary) and open minded. Constantly talk to other kinds of people
- Remain skeptical (e.g. AF ablation results), read critically, talk to the people that you trust, go to meetings
- Understand physiology: you need to learn much more than how to perform procedures