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

David J. Callans, MD
University of Pennsylvania
School of Medicine

Honoraria for consulting / lecturing: Biosense Webster, St. Jude Medical, Medtronic, Boston Scientific, Biotronik
When I was a fellow...

- 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

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

- 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

- 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
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

Ukena C: Clin Res Cardiol 2012;101:63-67
Interventional cardiology skills

- 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
Left atrial appendage closure

Plane of maximum diameter distal to ostium

Fixation barbs engage LAA wall
Advanced imaging skills

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

LA
LAA
LV
LCC
LSPV
LA
LAA
P
Detection of effusion / tamponade
32M with normal TTE

Mid-myocardial delayed enhancement
Real-time MRI guidance in EP lab

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

MR Thermography

A  Temperature Change > 50°C

B  Delayed Gadolinium Enhancement image

C  TTC Stained Gross Pathology

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.
Emerging technology

• 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)

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