Update in Cardiac Electrophysiology

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Cardiac Electrophysiology and Pacing
Disclosure

• Research support: Boston Scientific, Medtronic, St Jude, and Biotronik, Biosense-Webster
How to approach it?
NATURAL SELECTION

You notice how most of them are actually leaning TOWARD impending doom?

PunditKitchen.com
Palpitations ? Normal Aging
Documentation is the key

- 12 Lead EKG
- Holter
- Event Holter (cardionet or lifewatch)
- Implantable loop recorder
- Pacemaker (remote monitoring)
- ICD/CRTD (home monitoring)
"Feel my pacemaker if you don't believe me!"
% of Cryptogenic Stroke Patients with AF Detected by Various Monitoring Methods

- 1 ECG: 2.7%
- Multiple ECGs: 6.7%
- 24 hour Holter: 10.6%
- 7 day Monitor: 16.7%
- Continuous
Atrial fibrillation

• AF is the most common sustained arrhythmia
• Affects millions of Americans
• 3-5% yearly risk of stroke if untreated\(^1,2\)
Risk factors for stroke in AF

- Epidemiological
- CHADS2
- CHA2DS2-VASC

- Mechanism
- LAA velocity
- Spontaneous contrast
- LA fibrosis
- AF paroxysmal or persistent
- AF burden
- LAA morphology
CHADS2

- C-recent CHF
- H-hypertension
- A-age>75
- D-Diabetes
- S2-TIA or stroke
- Gage JAMA 2001

• 0-1.9%
• 1-2.8%
• 2-4.0%
• 3-5.9%
• 4-8.5%
• 5-12.5%
• 6-18.2%
Limitation of CHADS2

- Stroke risk in AF rise for age > 65
- Failure to predict stroke rate
- Failure to account for increased risk of stroke in female

- CHAD2S2-VASC
- Vascular disease (prior MI, PAD or aortic plaque)
- Age 65-74: 1
- Age > 75: 2
- Female: 1

Maximal score: 9
How to treat them?

- 1) Targeting atrial fibrillation
- 2) Targeting stroke risk directly
GPS system mapping

Real-time Differential GPS
Intracardiac ultrasound
Ablation targets (left atrium)
Cryoballoon ablation

- **Guidewire lumen**: Helps guide the catheter to the atrium and facilitates injection of dye to confirm occlusion of the vein.
- **Inner balloon**: Refrigerant is delivered into the inner balloon and vacuumed back into the console to achieve the treating process.
- **Outer balloon**: An additional safety feature designed to withstand peak pressure and contain the refrigerant in the unlikely event that the inner balloon is compromised. The outer balloon is maintained under constant vacuum.
- **Pullwires**: Help deflect the catheter 45° in either direction.
- **Thermocouple**: Monitors the temperature of the vaporized refrigerant.
- **Injection tube**: Refrigerant is delivered through the injection tube into the inner balloon. Temperatures as low as -76°C are achieved in less than a minute.
Fire and ICE

- Compare radiofrequency ablation versus ICE
- 65% event free for one year
- Comparable outcome
Success Rates

• Paroxysmal (up to 85% to 90%): May consider to cure afib in early paroxysmal stage

• Persistent or long standing persistent
  – Lower success rate with first attempt and hopefully higher success rate with hybrid ablation
  – ??? Does ablation minimize the risk of stroke? CABANA study
Hybrid Ablation
Visual Ablation Of Left Atrium Posterior

- AF Foci Located Along PV Tissue
- Posterior LA Derives Embryologically from PVs
- PVI Does Not Address Reentrant Circuits
- Need to Ablate Posterior LA to Prevent Wavelets
Hybrid Ablation Outcome

2013-2016
Hybrid Ablations Overall Percentage

Overall Total Patients: 30

Recurrence
Non Recurrence
Repeat Ablation

16%
81%
3%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
Stroke prevention

1) Coumadin
2) Dabigatran (Pradaxa): director thrombin inhibitor 75mg to 150mg PO bid, now antidote approved by FDA
3) Rivaroxaban (Xarelto): Xa inhibitor
4) Apixaban (Eliquis): Xa inhibitor
5) Savaysa (edoxaban): Xa inhibitor
Left atrial appendage

- The left atrial appendage: our most lethal human attachment!
- >90% of emboli originating from LAA
- Physiology role of LAA
LAA Exclusion device

• Lariat (Sentreheart): FDA approved
LAA occlusion

- Watchman device (Boston Scientific-Not FDA approved: PREVAIL and PROTECT AF)
St Jude Amplatzer Cardiac Plug2 (Not FDA approved)

Figure 4. Released ACP device following implantation demonstrating occlusion of the orifice of the left atrial appendage.
Surgical approach

- MAZE procedure and LAA ligation
- Mini-MAZE
- Hybrid Ablation
- --N contact
- --Atricure
More information
Fainting
Documentation is the key

- Event Holter (cardionet or lifewatch)
- Implantable loop recorder
ICD

External Defibrillator

Metal paddle

EKG lead

Ventricular fibrillation

Normal EKG

Implantable Defibrillator

Electrode charge
1980
Large device
Abdominal site
High perioperative mortality rate (9%)
Device longevity around 1.5 years

2002
Small device
Pectoral site
Perioperative mortality rate <1%
Device longevity around 5-9 years
Lifevest
S-ICD
S-ICD (one month postop)
PVCs, Just a nuisance?

1. Will consider to have ablation if PVCs more than 12-15K on Holter or PVC > 12-15%
2. Arrange echo to assess the progression of cardiomyopathy (LVEF improves from 28% to 42% after PVC ablation)
Ventricular tachycardia

1. If normal LV function, consider ablation
2. If LVEF <35%, consider ICD +/- ablation
3. More favors ablation rather than antiarrhythmic med such as amiodarone
Fluroless Technique

- Ready for primetime?
- Benefit our pts, staffs, and ourselves
- (maybe a few hair follicles for me)
- Application in AF, AFL, AT, VT including ischemic and outflow tract VT
- Pacemaker and ICD with aid of intracardiac ultrasound
Internist or FP, Neurologist, cardiologist, and CT surgeon
THANK YOU SO MUCH!

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