Update on Atrial Fibrillation: New Insights from Trial Data that Provide Answers to Clinical Questions

Eastern Shore Medical Symposium
Monday, June 28, 2021

Behzad Pavri, MD, FACC, FHRS
Professor of Medicine
Director, Electrophysiology Fellowship Program
Thomas Jefferson University Hospital
Update on Atrial Fibrillation: A Plug for AF Ablation?
If Anything, it’s a plug for Rhythm Control!

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Talk Outline

• Quick Review of AF Timeline and the “4 Pillars” of AF management

• Questions to ask based on newer data, which I’ll try to answer
  1. How to assess whether AF patient is symptomatic?
  2. What are realistic expectations after AF ablation?
  3. What data support ablation efficacy over AAD for rhythm control?
  4. When to offer (timing of) Rhythm Control (AAD or AF ablation)?
  5. What about AF and HF? Are there data about superiority of ablation vs. AAD in HF pts?
  6. Finally, what are the data about “ablate and pace” for rate control?

• Additional observations and take-home messages
AF Timeline – Current Understanding

More than Just Rhythm Control vs. Rate control...

**Modifiable RFs**
- Obesity
- Fitness
- HTN
- OSA
- CRF
- HF
- Alcohol

**Non-Modifiable RFs**
- Age
- Genetics

**Atrial electroanatomic remodeling**

**Upstream RF Control**

**AF**

**AF Outcomes**
- AF recurrence
- AF-related symptoms
  - ↓ QoL
  - Stroke/embolism
  - CHF
  - Morbidity/mortality
  - Healthcare expenses

**Antiarrhythmic drugs Ablation**
The 4 Pillars of AF Management

Atrial Fibrillation

- Avoid Alcohol
- Rx OSA
- Rx HTN
- Lose weight
- ↑ fitness
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• Additional Observations and take-home messages
Let’s Start with a word on “Symptomatic” vs “Asymptomatic” AF...

- What defines symptomatic AF?
- Clearly, asking “Do you have palpitations?” is not enough
- Most patients will not notice any overt, rate-related symptoms (such as palpitations/irregular heart beat), and may be truly asymptomatic for the first many days/weeks...
- But eventually, over time, they may gradually notice subtle exertional dyspnea, malaise, decreased exercise capacity, weight gain, ankle edema, orthopnea... but may need to ask the pt
- Only definitive way to determine if they are truly symptomatic from AF is to perform a CV and see if they improve. If they do, then they should be considered to be symptomatic in AF, and rhythm control should be opted for
Data Shows that Physicians Routinely Underestimate Symptoms that Impact QoL in AF Patients

• METHODS:
  – Analysis of KiCS-AF (Keio Interhospital Cardiovascular Studies–AF) registry
  – Pts had symptom burden assessed by AF Effect on QualiTy-of-life (AFEQT) questionnaire
  – Under-recognition of symptoms: defined as no subjective complaints picked up by MDs despite self-reported AFEQT scores ≤80

• RESULT:
  – 1,173/3,276 (36%) pts had AFEQT score ≤80 denoting SYMPTOMATIC status
  – 306/1,173 (28%) of these pts were under-recognized as being symptomatic by MDs → more likely to NOT be offered rhythm control/ablation (OR 0.41, p < 0.001)
  – Of the 1,173 symptomatic pts, only 459 (39%) got AF ablation; at 1-yr F/U, the ablated pts had greatest improvement in AFEQT scores

• CONCLUSIONS: MDs under-recognize AF symptoms in >¼th of symptomatic AF pts → less use of ablation → pts deprived of symptom relief

Katsumata Y et al. Symptom Under-Recognition of Atrial Fibrillation Patients in Consideration for Catheter Ablation: A Report From the KiCS-AF Registry JACC Clin Electrophysiol 2021;7:565-574
So... How does One Approach the Patient with AF?

**Principles of management:**
- AF is rarely “new onset”; simply 1\textsuperscript{st} recognition of AF
- Be cautious about initially declaring a patient “asymptomatic”; reassess in a few weeks
- HOWEVER: **AF begets AF!** So the longer one waits to restore sinus rhythm, the lower the success rates for maintenance of sinus rhythm
- When in doubt about symptoms, offer a CV (±AAD) and see if symptoms improve
- It is now reasonable to offer ablation as first line therapy, depending on patient preferences, comorbidities and age
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• Additional Observations and take-home messages
What is a Realistic Expectation of “Success” after AF Ablation?

- We had set the bar high for ablation success:
  - 98% for AVNRT
  - 90-98% for WPW
  - 97% for typical atrial flutter
- However, these arrhythmias have point sources or localized targets:
  - Slow pathway for AVNRT
  - Accessory pathway for WPW
  - CTI for typical atrial flutter
- Cannot realistically expect similar success rates when targets for AF ablation are 4 (sometimes 6!) PVs, plus scarred/dilated atria
- Do we consider anti-hypertensives to be futile when a pt has poorly controlled BP?
- Do we consider stents to be futile when a pt uses SL NTG for recurrent angina?
What is a Realistic Expectation of “Success” after AF Ablation?

• We **CAN** expect: >75% near-complete abolition of **paroxysmal** AF  
  ≈60-70% for **persistent** AF  
  <50% for **long-standing persistent or chronic** AF

• A better way to assess ablation success is to assess **AF burden** after ablation – and it almost always improves greatly in paroxysmal and persistent AF pts

• And there are almost always additional shades of benefit in the remainder who “fail” ablation:
  – Fewer/Shorter episodes
  – Persistent AF may become paroxysmal
  – Previously failed AADs may now become effective
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• Additional Observations and take-home messages
Do the Data Support Superiority of Ablation Over AAD?
A Meta-analysis of Randomized Clinical Trials

Q: Is AF ablation as first-line therapy safe and effective, as compared to AADs for PAF

METHODS:
– RCTs that had at least 12 mo F/U and reported clinical outcomes of ablation vs AADs as first-line therapy
– Main outcomes: safety and efficacy of AF ablation as first-line therapy vs. AADs

RESULTS:
– 6 RCTs met inclusion criteria, 1212 pts (609 got AF ablation; 603 got AAD therapy)

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Ablation</th>
<th>AAD</th>
<th>RR</th>
<th>95% CI</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arrhythmia recurrence</td>
<td>32.3%</td>
<td>53%</td>
<td>RR 0.62</td>
<td>0.51-0.74</td>
<td>&lt;.001</td>
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<tr>
<td>Symptomatic arrhythmia recurrence</td>
<td>11.8%</td>
<td>26.4%</td>
<td>RR 0.44</td>
<td>0.27-0.72</td>
<td>.001</td>
</tr>
<tr>
<td>Rate of hospitalizations</td>
<td>5.6%</td>
<td>18.7%</td>
<td>RR 0.32</td>
<td>0.19-0.53</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Serious adverse events</td>
<td>4.2%</td>
<td>2.8%</td>
<td>RR 1.52</td>
<td>0.81-2.85</td>
<td>.19</td>
</tr>
</tbody>
</table>

CONCLUSIONS:
– Ablation is associated with ↓ in AF recurrence and hospitalizations, with no difference in major adverse events
Observational study; compared stroke & CV hospitalization in AF pts Rx with ablation vs. AADs

**METHODS:**
- Used 5-yr claims data (2010–2014); minimum 1 yr F/U
- 2:1 propensity score matching for age, gender, co-morbidities, and total medical cost

**End points:** thromboembolic event (ischemic stroke/TIA/systemic embolism), all CV hospitalization

**RESULTS:**
- 29,456 Rx with AAD matched to 14,728 ablation pts
- No significant differences in age (64±10 in both grps), gender (58% M), or CHA2DS2-VASc score (3.2±1.3)
- Risk of thromboembolic event was 41% greater in the AADs group (p < 0.001), and cardiovascular hospitalizations were 13% more likely (p < 0.001)

**CONCLUSIONS:** AF ablation provided ↓ risk of thromboembolic events and CV hospitalizations than a matched cohort of pts Rx with AADs

Mansour M et al. Stroke and Cardiovascular Events After Ablation or Antiarrhythmic Drugs for Treatment of Patients With Atrial Fibrillation. Am J Cardiol 2018;121(10):1192-1199
Any Other Benefits of AF Ablation?
Rates of Death, Stroke, and Dementia?

- AF adversely impacts mortality, stroke, HF, and dementia. Ablation reduces AF burden.

**METHODS:**
- 3 groups (1:4:4)
  - 4,212 consecutive AF ablation pts
  - 16,848 age/gender matched controls with AF (but no ablation); 16,848 age/gender matched controls without AF

**RESULTS:**
- N=37,908, age 65.0±13 yrs; AF ablation pts had less DM, more HTN, HF, and valvular disease; F/U: ≥3 yrs
- 5,667 (14.9%) died, 1,296 (3.4%) had a stroke, and 1,096 (2.9%) were hospitalized for HF
- AF ablation pts had a lower risk of death and stroke compared to AF but no ablation pts
- Alzheimer’s dementia occurred in 0.2% of the AF ablation pts vs 0.9% of the AF but no ablation pts and 0.5% of no AF pts (P < 0.0001)
- AF ablation pts had similar long-term rates of death, dementia, and stroke to pts without AF

**CONCLUSIONS:**
- AF ablation pts have lower risk of death, stroke, and dementia compared to pts without ablation
- AF ablation may reduce the increased risk of death and stroke associated with AF

Can AF Ablation Avoid Pacemakers in Tachy-Brady Syndrome with Conversion Pauses?

Q: Which would you rather have: a pacemaker + AAD for the rest of your life, or an ablation that avoids both?

Historic treatment standard: Antiarrhythmic Drugs + Pacemaker

New recommendation - Catheter ablation: No Pacemaker (IIA Indication) (Calkins et al Heart Rhythm 2017)

Inada, K., et al Europace, 2014. 16(2): 208-13

Only 3/37 pts with PM

5 year follow-up

Paroxysmal AF patients = 280

TBS patients = 37

1st ablation

Sinus rhythm = 19

AF recurrence = 18

2nd ablation = 14

Pacemaker = 1

Sinus rhythm = 11

AF recurrence = 3

3rd ablation = 2

Pacemaker = 1

Sinus rhythm = 1

Sick sinus = 1

Pacemaker = 1

Pacemaker implantation was not performed in patients without prolonged sinus pauses.
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• Additional Observations and take-home messages
When should One Consider Offering Ablation For a Patent with AF?

- **Step 1:** Decide if pt is symptomatic *in any way* from AF (although this too, may change in the future); if unsure, consider trial of CV
- **Step 2:** Determine AF burden – extended Holter, smart watch/wearable technology, Kardia mobile, etc.
- **Step 3:**
  - If symptomatic + very low burden of PAF → reasonable to consider pill-in-pocket
  - If symptomatic + moderate or high burden of PAF → discuss AAD vs. ablation (consider EP consult, always happy to help!)
  - If symptomatic + persistent AF → CV with AAD or ablation
  - If symptomatic + chronic AF → AVN modification + pacing (conduction system or BiV)
Early Rhythm Control in all AF Patients with CV Comorbidities, Irrespective of Symptoms - EAST-AFNET

Q: Can early rhythm-control therapy reduce risk of CV complications?

METHODS:
- Pts with early AF (diagnosed within ≤1 yr) and CV conditions randomized to receive either early rhythm control or usual care
- Early rhythm control: Antiarrhythmic drugs or atrial fibrillation ablation
- Usual care: Rhythm control only for AF-related symptoms
- 1st primary outcome: Composite of death from CV causes, stroke, or hospitalization with worsening of heart failure/acute coronary syndrome
- 2nd primary outcome: Number of nights spent in the hospital/yr
- Primary safety outcome: Composite of death, stroke, or serious adverse events related to rhythm-control therapy
- Secondary outcomes: Symptoms, LVEF

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Early Rhythm Control (N=1395)</th>
<th>Usual Care (N=1394)</th>
</tr>
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<tbody>
<tr>
<td>Concomitant cardiovascular conditions</td>
<td></td>
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<tr>
<td>Previous stroke or transient ischemic attack — no. (%)</td>
<td>175 (12.5)</td>
<td>153 (11.0)</td>
</tr>
<tr>
<td>At least mild cognitive impairment — no./total no. (%)</td>
<td>582/1326 (43.9)</td>
<td>584/1341 (43.5)</td>
</tr>
<tr>
<td>Arterial hypertension — no. (%)</td>
<td>1230 (88.2)</td>
<td>1220 (87.5)</td>
</tr>
<tr>
<td>Blood pressure — mm Hg</td>
<td></td>
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</tr>
<tr>
<td>Systolic</td>
<td>136.5±19.4</td>
<td>137.5±19.3</td>
</tr>
<tr>
<td>Diastolic</td>
<td>80.9±12.1</td>
<td>81.3±12.0</td>
</tr>
<tr>
<td>Stable heart failure — no. (%)</td>
<td>396 (28.4)</td>
<td>402 (28.8)</td>
</tr>
<tr>
<td>CHA2DS2-VASc score††</td>
<td>3.4±1.3</td>
<td>3.3±1.3</td>
</tr>
<tr>
<td>Valvular heart disease — no./total no. (%)</td>
<td>609/1389 (43.8)</td>
<td>642/1391 (46.2)</td>
</tr>
<tr>
<td>Chronic kidney disease of MDRD stage 3 or 4 — no. (%)‡‡</td>
<td>172 (12.3)</td>
<td>179 (12.8)</td>
</tr>
</tbody>
</table>

Early Rhythm Control in all AF Patients with CV Comorbidities, *Irrespective of Symptoms* – EAST-AFNET

**RESULTS:**
- 2789 pts with early AF (mean age 70.3 yrs) from 35 centers
- Trial was *stopped early* for efficacy after a median of 5.1 yrs of F/U per pt
- A first-primary-outcome event occurred in: 249/1395 (18%) pts assigned to early rhythm control (3.9/100 person-yrs) vs 316/1394 (23%) pts assigned to usual care (5/100 person-yrs) (HR 0.79; 96% CI 0.66-0.94; P=0.005)
- No sig difference in:
  - Mean (±SD) number of nights in the hospital
  - % of pts with a primary safety outcome event
  - Symptoms or LVEF at 2 yrs
- Serious adverse events occurred in 4.9% of the early rhythm control pts and 1.4% of usual care pts

**CONCLUSIONS:** Early rhythm-control therapy was associated with lower risk of adverse CV outcomes vs. usual care in pts with early AF and CV conditions

• Q: Does the TIMING of starting rhythm control strategy affect the results?

• METHODS:
  – Longitudinal observational cohort study from the Korean National Health Insurance Service database
  – N: 22,635 AF pts with CV comorbidities, started on rhythm control (AAD/ablation) or rate control
  – Primary Endpoint: Composite of death from CV causes, ischemic stroke, HF hospital admission, acute MI

• RESULTS:
  – 13,653 Rx with Rhythm Control; (53.9%) M, median age was 70, median follow-up=2.1 yrs
  – If Rhythm Control started within 1 yr of AF diagnosis  A lower risk of the primary endpoint compared to Rate Control (incidence per 100 person‐yrs = 7.42 vs 9.25; HR 0.81, 95% CI 0.71 to 0.93; P=0.002
  – If Rhythm Control started >1 yr after AF diagnosis  No difference in the risk of the primary composite outcome (incidence per 100 person yrs = 8.67 vs 8.99; HR 0.97, 95% CI 0.78 to 1.20; P=0.76

• CONCLUSIONS: Initiation of rhythm control within 1 yr of AF recognition was associated with a lower risk of adverse CV outcomes than rate control, but not if rhythm control was started >1 yr after AF recognition.

When is AF Ablation Most Likely to be Successful?

- Ideally, early in the course of AF, while still paroxysmal, before it becomes persistent
- Before interatrial conduction delay (Bayes syndrome) is apparent on ECG
- Before LA dilation by echo
- **NOT** after pt has failed CV 6 times, failed 3 AADs, has been in continuous AF for >6 months, LA has become stretched and fibrosed/scarred...
Is Early Ablation AF Really Beneficial?
The STOP-AF Trial

- Q: What is the safety and efficacy of cryoballoon ablation as initial first-line AF Rx?
- METHODS:
  - Multicenter RCT in PAF pts with untreated PAF
  - Assigned (1:1) to AAD (class I or III agents) or ablation (PVI by cryoballoon)
  - Monitoring for recurrence: 12-lead ECGs every 3 mo, pt-activated telephone monitoring every week and with symptoms; and 24-hour Holters at 6 and 12 mo
  - Primary efficacy end point: Freedom from atrial arrhythmia recurrence
  - Primary safety end point: Assessed in the ablation group only, and was a composite of several procedure-related and cryoballoon system–related serious adverse events

• RESULTS:
  - 203 pts randomized (104 ablation, and 99 initially AAD)
  - Ablation group: Initial ablation success in 97%
  - Kaplan–Meier estimate of the % of pts with Rx success at 12 month was 74.6% (95% CI 65.0–82.0) in ablation group and 45.0% (95% CI 34.6–54.7) in the AAD group (P<0.001)
  - Two primary safety end-point events occurred in ablation group

• CONCLUSIONS: Cryoballoon ablation was superior to AAD as initial therapy for the prevention of atrial arrhythmia recurrence in pts with PAF; serious procedure-related adverse events were uncommon

Is Early Ablation Really Beneficial?
The STOP-AF Trial

Cryoballoon to Achieve PVI
Cryoballoon to Achieve PVI
Is Early Ablation Really Beneficial?  
The EARLY-AF Trial

• Q: Is 1st-line ablation more effective in maintaining sinus rhythm than trying AAD?

• METHODS:
  – Randomized 303 pts with symptomatic, paroxysmal, untreated AF to ablation with a cryoballoon or to AAD for initial rhythm control
  – All pts got an ILR to continuously monitor atrial arrhythmia burden
  – F/U: 12 mo
  – Primary end point: 1st recurrence of any atrial arrhythmia (AF, A flutter, or AT) between 91 and 365 days after Rx
  – Secondary end points: Freedom from symptoms, AF burden, and QoL

Is Early Ablation Really Beneficial?

The EARLY-AF Trial

• RESULTS:
  – At 1 yr, atrial arrhythmia recurred in 66/154 ablation pts (42.9%) and in 101/149 AAD pts (67.8%), HR 0.48; 95% CI 0.35–0.66; P<0.001
  – Symptomatic atrial arrhythmia recurred in 11.0% of ablation pts and in 26.2% of AAD pts, HR 0.39; 95% CI 0.22–0.68
  – Median % of time in AF was 0% (interquartile range, 0–0.08) with ablation and 0.13% (interquartile range, 0–1.60) with AAD
  – Serious adverse events occurred in 5 ablation pts (3.2%) and in 6 AAD pts (4.0%)

• CONCLUSIONS: In pts receiving initial treatment for symptomatic, paroxysmal AF, there was a significantly lower rate of AF recurrence with cryoballoon ablation than with antiarrhythmic drug therapy, as assessed by continuous cardiac rhythm monitoring.
Meta-Analysis of **Diagnosis-to-Ablation Time** and AF Recurrence

- 6 studies, 4950 pts undergoing AF ablation for symptomatic AF
- A shorter DAT ≤1 yr was associated with lower risk of AF recurrence, vs. DAT >1 yr (RR 0.73; 95% CI 0.65–0.82, P<0.001)
- CONCLUSION: Shorter time between initial AF diagnosis and AF ablation is associated with an increased likelihood of ablation procedural success

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• Additional Observations and take-home messages
Newer Insights into AF and HF

- AF can no longer be viewed as a passive bystander in the setting of HF
- Rather, AF is an active determinant of clinical outcome in HF
- AF is an underappreciated cause of HF
- There is bidirectional interaction between AF and HF\(^1\)
- AF management \(\rightarrow\) influences HF management
- Since the days of AFFIRM, we have known that the pts who were able to maintain NSR did the best with fewer HF symptoms and better functional status than those in the rate control arm\(^2\)

AF

Mutual risk factors
- Hypertension
- Diabetes mellitus
- Obesity
- Smoking
- Sleep apnea syndrome

HF
When can AF Ablation be expected to Improve LVEF?

- LVEF improvement is most likely in pts with AF and HF who demonstrated the following 6 features:
  - Non-ischemic/idiopathic cardiomyopathy
  - AF and HF “co-diagnosed” – 1st recognized together
  - No scar seen by MRI with LGE
  - High burden of PAF or recent development of persistent AF (< 6 mo)
  - LA not severely enlarged
  - No IACD on ECG

Meta Analysis #1 of RCTs Comparing AF Ablation to Medical Rx in HFrEF

• PURPOSE: To compare benefits and harms between ablation and medical Rx in pts with AF and HF; included RCTs with ≥6 mo F/U

• RESULTS:
  - 6 RCTs, 775 pts

<table>
<thead>
<tr>
<th></th>
<th>Ablation</th>
<th>AAD Rx</th>
<th>RR</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mortality</td>
<td>9.0%</td>
<td>17.6%</td>
<td>0.52</td>
<td>&lt;.05</td>
</tr>
<tr>
<td>HF Hospitalization</td>
<td>16.4%</td>
<td>27.6%</td>
<td>0.60</td>
<td>&lt;.05</td>
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<tr>
<td>LVEF Improvement</td>
<td>6.95% more with ablation vs. AAD</td>
<td>-</td>
<td>&lt;0.05</td>
<td></td>
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<tr>
<td>6 min Walk Distance Increase</td>
<td>20.93 m more with ablation vs. AAD</td>
<td>-</td>
<td>&lt;.05</td>
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</tr>
<tr>
<td>Vo2max</td>
<td>3.17 mL/kg per minute more with ablation vs. AAD</td>
<td>-</td>
<td>&lt;.05</td>
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<tr>
<td>QoL Scores</td>
<td>-9.02 points more with ablation vs. AAD</td>
<td>-</td>
<td>&lt;.05</td>
<td></td>
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<tr>
<td>Adverse Effects</td>
<td>7.2%</td>
<td>3.8%</td>
<td>1.68</td>
<td>NS</td>
</tr>
</tbody>
</table>

• CONCLUSION: AF ablation is superior to drug therapy in improving all-cause mortality, HF hospitalizations, LVEF, 6-minute walk test distance, Vo2max, and quality of life, with no statistically significant increase in serious adverse events

Turagam MK et al. Catheter Ablation of Atrial Fibrillation in Patients With Heart Failure: A Meta-analysis of Randomized Controlled Trials 
Meta Analysis #2 of RCTs Comparing AF Ablation to Medical Rx in HFrEF

- **PURPOSE:** To compare ablation vs medical therapy in AF and HF
  - Primary end-point: All-cause mortality
  - Secondary outcomes: HF-related hospitalizations, change in LVEF

- **RESULTS:**
  - 7 RCTs, 856 pts (429 ablation, 427 medical Rx arm)

<table>
<thead>
<tr>
<th></th>
<th>Ablation vs. AAD RR</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mortality</td>
<td>RR 0.50; 95% CI: 0.34 to 0.74</td>
<td>0.0005</td>
</tr>
<tr>
<td>HF Hospitalizations</td>
<td>RR 0.56; 95% CI: 0.44 to 0.71</td>
<td>&lt; 0.0001</td>
</tr>
<tr>
<td>LVEF</td>
<td>Weighted mean difference: 7.48%</td>
<td>&lt; 0.0001</td>
</tr>
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<td></td>
<td>95% CI: 3.71 to 11.26</td>
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</table>

- **CONCLUSIONS:** In pts with AF and HF, ablation was associated with significant ↓ in *mortality* and HF hospitalizations, and an ↑ in LVEF, as compared to medical Rx

**Meta Analysis #3 of RCTs Comparing Rhythm Control by AF Ablation to Medical Rx in HFrEF**

- **Q:** To evaluate the efficacy and safety of rhythm control strategy in pts with AF and HF
- **METHODS AND RESULTS:**
  - RCTs comparing rhythm control using antiarrhythmic drugs (AADs) vs. rate control (Subset A); OR
  - RCTs comparing rhythm control using ablation vs. AAD (Subset B)
  - A total of 11 studies involving 3598 patients were enrolled (Subset A: 2486; Subset B: 1112)
  - Primary outcomes: All-cause mortality, re-hospitalization, stroke, and thromboembolic events

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<thead>
<tr>
<th></th>
<th>Rhythm Control with AAD vs. Medical Rate Control</th>
<th>P value</th>
<th>Rhythm Control with Ablation vs. AAD</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mortality</td>
<td>0.96</td>
<td>0.65</td>
<td>0.51</td>
<td>0.0003</td>
</tr>
<tr>
<td>Rate of Re-Hospitalization</td>
<td>1.25 (↑)</td>
<td>0.01</td>
<td>0.44</td>
<td>0.003</td>
</tr>
<tr>
<td>Rate of stroke and thromboembolic events</td>
<td>0.91</td>
<td>0.76</td>
<td>0.59</td>
<td>0.27</td>
</tr>
<tr>
<td>Arrhythmia recurrence</td>
<td>-</td>
<td>-</td>
<td>29.6% vs. 80.1%, OR: 0.04</td>
<td>&lt; 0.00001</td>
</tr>
<tr>
<td>Improvement in LVEF</td>
<td>-</td>
<td>-</td>
<td>WMD: 6.8%</td>
<td>0.0004</td>
</tr>
<tr>
<td>Improvement in QoL Score</td>
<td>-</td>
<td>-</td>
<td>WMD: -9.1</td>
<td>0.007</td>
</tr>
</tbody>
</table>

- **CONCLUSION:** Rhythm control by ablation improves survival, ↓ re-hospitalization, ↑ rate of sinus rhythm, preserves cardiac function, and improves QoL for AF and HF pts

Chen S et al. Rhythm control for patients with atrial fibrillation complicated with heart failure in the contemporary era of catheter ablation: a stratified pooled analysis of randomized data European Heart Journal 2019 July 11
Talk Outline

- Quick Review of AF Timeline and the “4 Pillars” of AF management
- Questions to ask based on newer data, which I’ll try to answer
  1. How to assess whether AF patient is symptomatic?
  2. What are realistic expectations after AF ablation?
  3. What data support ablation efficacy over AAD for rhythm control?
  4. When to offer (timing of) Rhythm Control (AAD or AF ablation)?
  5. What about AF and HF? Are there data about superiority of ablation vs. AAD in HF pts?
  6. Finally, what are the data about “ablate and pace” for rate control?
- Additional Observations and take-home messages
When to consider the “Pace and Ablate” Strategy?

Major Society Guidelines (AHA/ACC/HRS and 2016 ESC) describe the Role of AV Node Ablation in AF:

1. **AV Node Ablation for Ventricular Rate Control:** “Atrioventricular nodal ablation with permanent ventricular pacing is reasonable to control heart rate when pharmacological therapy is inadequate and rhythm control is not achievable.” (Class IIa Level of Evidence: B)

2. **AV Node Ablation For Ventricular Rate Control in Patients with HF and AF:** “It is reasonable to perform AV node ablation with ventricular pacing to control heart rate when pharmacological therapy is insufficient or not tolerated.” (Class IIa Level of Evidence: B)
Pace and Ablate Strategy

Advantages

- Avoid adverse drug effects associated with pharmacological rate or rhythm control strategies
- Durable rate control strategy
- Not reliant on patient compliance with medications
- Reversal of tachy-myopathy (≈60% with RV pacing, ≈80% with CRT-P)

Disadvantages

- Renders patients pacemaker-dependent
- Device and pacing lead related issues e.g. recalls, infection, HF
- Uncertain effects of chronic RV pacing
- Procedural complications related to pacemaker implantation and AVNA

Impact of AVNA vs Medical Therapy on Outcomes in CRT-AF Patients

<table>
<thead>
<tr>
<th>Impact of AVNA vs Medical Therapy on Outcomes in CRT-AF Patients</th>
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<tbody>
<tr>
<td>All-Cause Mortality (n = 3 studies)</td>
<td>Risk Ratio = 0.42</td>
<td>p &lt; 0.001</td>
</tr>
<tr>
<td>Cardiovascular Mortality (n = 2 studies)</td>
<td>Risk Ratio = 0.44</td>
<td>p = 0.008</td>
</tr>
<tr>
<td>Change in LVEF (n = 3 studies)</td>
<td>Mean Difference = 6.14</td>
<td>p = 0.21</td>
</tr>
<tr>
<td>Change in NYHA (n = 3 studies)</td>
<td>Mean Difference = -0.34</td>
<td>p = 0.002</td>
</tr>
</tbody>
</table>

- At TJUH, we perform “compact AV node modification” \(\rightarrow\) ensures a reliable escape
- We perform **conduction system pacing** \(\rightarrow\) preserves narrow QRS and synchrony
CXR and ECG in pt with Chronic AF, s/p AVN modification and His Bundle Pacing
CXR and ECG in pt with AF, s/p AVN modification and Left Bundle Area Pacing
Talk Outline

- Quick Review of AF Timeline and the “4 Pillars” of AF management
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Additional, Important, Data-Proven Clinical Observations Regarding AF

- **AF be thought of as a continuum**
  - Starting with interatrial conduction delay (Bayes) → frequent PACs → PAT → rare PAF → Persistent AF → Chronic AF → permanent AF
- Do not think of “New-Onset AF”, but rather **“First Recognition of AF”**
- Not just CHA2DS2-VASc score, AF **burden** matters; helps determine when one starts anticoagulation in low-risk AF pts
- **Must** remember to address upstream RFs: alcohol, OSA, BP control, obesity/weight loss, cardiorespiratory fitness, smoking
  - Their combined impact is greater than any of our interventions
  - All interventions are less effective if these RFs are not addressed
Take-Home Messages

1. Be wary of initially declaring the AF pt “asymptomatic” – reassess in a few weeks, and if unsure, consider trial of CV to see if pt status improves

2. Rhythm control is definitely superior to rate control in symptomatic pts, and in asymptomatic AF pts who have other CV comorbidities

3. Large body of data attest to the superiority of ablation over AADs for rhythm control

4. Rhythm control (by AAD or by ablation) for AF is best offered *early* and is most successful early in the course of AF, before structural atrial remodeling has set in

5. In HF pts: AF is bad, SR is better, and ablation is the best way to attain SR
Thank you

behzad.pavri@Jefferson.edu