Living Healthy With Atrial Fibrillation

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Cardiac Electrophysiologist
Objectives

• Pathogenesis of atrial fibrillation
• Risk factors
• Treatment
  – Stroke risk
  – Symptom management
    • Medication
    • Ablation
    • Surgery
Objectives

- 2014 AHA/ACC/HRS Guidelines for the Management of Patients With Atrial Fibrillation
  - Recommendations are evidence based
  - Committee composed of clinicians with broad experience treating atrial fibrillation
What is Atrial Fibrillation?

- Tachyarrhythmia with disorganized atrial activation and ineffective atrial contraction
  - Electrocardiogram (ECG) characteristics include:
    1. Irregular R-R intervals
    2. Absence of distinct repeating P waves
    3. Irregular atrial activity.
What is Atrial Fibrillation?

- **Paroxysmal AF**
  - Self terminating episodes < 7 days

- **Persistent AF**
  - Episodes last > 7 days
  - "Longstanding" persistent AF if episodes > 1 year

- **Permanent AF**
  - Decision to make no further attempts at maintaining sinus rhythm
Mechanism

– AF requires both a trigger for initiation and an appropriate anatomic substrate for maintenance

– Triggers
  • Ectopic focal discharges often initiate AF
  • most commonly from left atrial pulmonary veins

Mechanism

Illustration: Tim Phelps © 2017 Johns Hopkins University, AAM.
Mechanism

- atrial fibrosis (scar) serves as the **substrate** for AF perpetuation.

- In general, more atrial fibrosis correlates with progression of atrial fibrillation

Mechanism

Pathogenesis

- If untreated, atrial fibrillation can lead to
  - Embolic events such as stroke
  - heart failure
  - other heart-related complications.
Pathogenesis

• The mechanism of stroke is embolization
• This is the cause of about 15 out of every 100 strokes.

Pathogenesis

- Mechanism of heart failure
Pathogenesis

- Symptoms
  - General fatigue
  - Rapid and irregular heartbeat
  - Fluttering or “thumping” in the chest
  - Dizziness
  - Shortness of breath and anxiety
  - Weakness
  - Faintness or confusion
  - Fatigue when exercising
  - Sweating
  - Chest pain or pressure

http://www.heart.org/HEARTORG/Conditions/Arrhythmia/AboutArrhythmia/What-are-the-Symptoms-of-Atrial-Fibrillation-AFib-or-AF_UCM_423777_Article.jsp#.WJkCIIpadGE
Pathogenesis

- How common is atrial fibrillation?
  - Number of individuals with AF in 2010 was 33.5 million

In a cross-sectional study of almost 1.9 million men and women, the prevalence of atrial fibrillation increases with age, ranging from 0.1 for those <55 years of age to over 9 percent in those ≥85 years of age. At all ages, the prevalence is higher in men than women.

Risk Factors

- Older than 60 years of age
- Diabetes
- High Blood Pressure
- Sleep apnea
- Coronary artery disease
- Congestive heart failure
- Structural heart disease (valve problems or congenital defects)
- Prior open-heart surgery
- Thyroid disease
- Chronic lung disease
- Excessive alcohol or stimulant use
- Serious illness or infection

http://www.hrsonline.org/Patient-Resources/Heart-Diseases-Disorders/Atrial-Fibrillation-AFib/Risk-Factors-for-AFib
• Approach to treatment
  1) Assess stroke risk and determine the need for anticoagulation

  2) Address symptoms
# Stroke Risk

<table>
<thead>
<tr>
<th>Risk factors</th>
<th>Stroke risk per year</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>C</strong> Congestive Heart Failure</td>
<td>+1 point</td>
</tr>
<tr>
<td><strong>H</strong> Hypertension</td>
<td>+1 point</td>
</tr>
<tr>
<td><strong>A&lt;sub&gt;2&lt;/sub&gt;</strong> Age ≥75</td>
<td>+2 point</td>
</tr>
<tr>
<td><strong>D</strong> Diabetes</td>
<td>+1 point</td>
</tr>
<tr>
<td><strong>S&lt;sub&gt;2&lt;/sub&gt;</strong> Stroke/TIA History</td>
<td>+2 point</td>
</tr>
<tr>
<td><strong>V</strong> Vascular Disease</td>
<td>+1 point</td>
</tr>
<tr>
<td><strong>A&lt;sub&gt;1&lt;/sub&gt;</strong> Age 65-74</td>
<td>+1 point</td>
</tr>
<tr>
<td><strong>S</strong> Sex (Female)</td>
<td>+1 point</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SCORE</th>
<th>% RATE PER YEAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>1</td>
<td>1.3%</td>
</tr>
<tr>
<td>2</td>
<td>2.2%</td>
</tr>
<tr>
<td>3</td>
<td>3.2%</td>
</tr>
<tr>
<td>4</td>
<td>4.0%</td>
</tr>
<tr>
<td>5</td>
<td>6.7%</td>
</tr>
<tr>
<td>6</td>
<td>9.8%</td>
</tr>
<tr>
<td>7</td>
<td>9.6%</td>
</tr>
<tr>
<td>8</td>
<td>6.7%</td>
</tr>
<tr>
<td>9</td>
<td>15.2%</td>
</tr>
</tbody>
</table>

Stroke Risk

• Oral anticoagulation is recommended for CHA$_2$DS$_2$-VASc score of 2 or greater

• For patients with nonvalvular AF and a CHA2DS2-VASc score of 0, it is reasonable to omit antithrombotic therapy

Stroke Risk

• Anticoagulants and antiplatelet agents
  – Warfarin
  – NOACs - dabigatran, rivaroxaban, edoxaban and apixaban
  – Aspirin (in rarer cases)
Stroke Risk

• Stroke prevention considerations in atrial fibrillation
  – Multiple trials demonstrate no benefit of aspirin alone in stroke prevention in AF
  – Anticoagulation should be chosen irrespective of whether the AF pattern is paroxysmal, persistent, or permanent
Stroke Risk

• Alternatives to anticoagulation
  – WATCHMAN device

Figure 3: WATCHMAN™ Left Atrial Appendage Closure Device (Boston Scientific).
Stroke Risk

• Alternatives to anticoagulation
  – LARIAT device
Symptom Management

- The symptoms of atrial fibrillation are different for each person.

- Plethora of medical, ablation, and surgical options exist
Symptom Management

- Medications
  - Rate control
    - Beta blockers
    - Calcium channel blockers
    - Digoxin
Symptom Management

• Medications
  – Rhythm control
    • Sotalol
    • Flecainide and propafenone
    • Dofetilide, dronedarone, and amiodarone
Symptom Management

• Medications
  – Rate or rhythm control?
    • overwhelming evidence indicates that rhythm control is equivalent to rate control in terms of mortality, morbidity, or quality of life
    • Young patients and elderly patients (> 80yo) excluded from these studies
  • But what about symptoms?

*STAF, HOT CAFÉ, AFFIRM, RACE trials
Symptom Management

Symptom Management

What's the best heart rate?

Strict control (< 80 bpm at rest)

Lenient Control (< 110bmp at rest)

Symptom Management

• Medications
  – Rhythm control
    • May help with symptoms, especially those that persist despite adequate rate control

• Certain patients benefit from rhythm control despite lack of symptoms
  – Tachycardia mediated cardiomyopathy
  – Diastolic heart failure
  – Valve disease
Symptom Management

• Medications
  – Rhythm control
  • Effectiveness
    – Sinus rhythm 1 year after initiation
      » 62% amiodarone
      » 23% class I drug (Flecainide or propafenone)
      » 38% sotalol

Symptom Management

- Medications
  - Rhythm control
- Effectiveness
  - Sinus rhythm 1 year after initiation
    » 58% dofetilide
    » Dofetilide has minimal noncardiac side effects.
    » 0.8% chance of inducing Torsades de Pointes
    » Initiated over 3 days in the hospital

Symptom Management

• Ablation
  – Option for patients who have failed medical therapy and remain symptomatic
  – Catheter based cardiac procedure
  – The cornerstone of atrial fibrillation ablation is pulmonary vein isolation
Antral ablation of pulmonary veins targets:

A – Ganglionic plexi
B – reentrant wavelets
C – Focal triggers
D – compilation

Symptom Management

• Ablation
  – Takes about 3 hours or so
  – Usually under general anesthesia
  – Venous access in femoral veins
Symptom Management

• Ablation
  – Transseptal puncture to gain access to left atrium

https://www.researchgate.net/figure/264347276_fig1_Fig-2-A-series-of-three-ICE-images-obtained-during-transseptal-puncture-RA-right
Symptom Management

• Ablation
  – Cryoballoon ablation or radiofrequency ablation of pulmonary vein antra

Symptom Management

For patients with paroxysmal atrial fibrillation, the highest quality studies estimate success rates of 85% one year after ablation.

<table>
<thead>
<tr>
<th>Study</th>
<th>PAF/PsAF</th>
<th>Ablation strategy (n)</th>
<th>Procedures (n)</th>
<th>AF freedom ablation</th>
<th>AAD (n)</th>
<th>AF freedom AAD</th>
<th>Complications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Krittayaphong et al.</td>
<td>100% PsAF</td>
<td>PVI + linear ablation RA (15)</td>
<td>1</td>
<td>78.65</td>
<td>15</td>
<td>40%</td>
<td>Abl: one stroke</td>
</tr>
<tr>
<td>Wazni et al.</td>
<td>96% PAF/4% PsAF</td>
<td>PVI (33)</td>
<td>1</td>
<td>85%</td>
<td>37</td>
<td>21%</td>
<td>Abl: 3% moderate PV stenosis</td>
</tr>
<tr>
<td>Pappone et al.</td>
<td>100% PAF</td>
<td>CPVA + CTI + mitral line (99)</td>
<td>1</td>
<td>85% without AAD</td>
<td>99</td>
<td>35%</td>
<td>Abl: one TIA, one effusion</td>
</tr>
<tr>
<td>Oral et al.</td>
<td>100% PsAF</td>
<td>CPVA + roof and mitral lines (77)</td>
<td>32% redo rate</td>
<td>74% without AAD</td>
<td>69</td>
<td>58% (77% cross-over to ablation)</td>
<td>AAD: adverse events 16%, pro-arrhythmia 3%</td>
</tr>
<tr>
<td>Stabile et al.</td>
<td>67% PAF/33% PsAF</td>
<td>CPVA + mitral line + CTI (68)</td>
<td>1</td>
<td>65.90%</td>
<td>69</td>
<td>8.70%</td>
<td>Abl: one ANV ablation + PM</td>
</tr>
<tr>
<td>Jais et al.</td>
<td>100% PAF</td>
<td>PVI ± extra PV ablation (53)</td>
<td>1.8</td>
<td>89% without AAD</td>
<td>59</td>
<td>23%</td>
<td>Abl: two tamponades, two haematomas, one PV stenosis; AAD: hyperthyroid, two unrelated death</td>
</tr>
<tr>
<td>Forleo et al.</td>
<td>41% PAF/59% PsAF</td>
<td>PVI + CTI ± roof and mitral lines (35)</td>
<td>1</td>
<td>80% without AAD</td>
<td>35</td>
<td>42.90%</td>
<td>Abl: one haematoma; hospitalization: 9% abl. vs. 34% AAD; adverse events: 3% abl vs. 17% AAD</td>
</tr>
</tbody>
</table>

Table 4 Randomized trial ablation vs. anti-arrhythmic drug

Literature review on drugs vs. ablation for AF treatment. Results after 1-year follow-up. AAD, anti-arrhythmic drug; PAF, paroxysmal AF; PsAF, persistent AF; PVI, pulmonary veins isolation; CPVA, circumferential pulmonary veins ablation; PM, pacemaker; SSS, sick sinus syndrome; AVN, atrioventricular node; Abl, ablation group.
Symptom Management

– Which is one is better?
  • Cryoballoon ablation or RF ablation?
  • FIRE and ICE Trial

Symptom Management

- Which is one is better?
  - Cryoballoon ablation or RF ablation?
  - FIRE and ICE Trial

Symptom Management

• Complications
  – 4.5% total rate of complication as of 2010
  – Death - 0.15%
  – atrio-oesophageal fistula - 0.04%
  – Cardiac tamponade - 1.31 %
  – Stroke - 0.23 %
  – Pulmonary vein injury - 0.29%.
  – bleeding complications -1.5%

Atrial Fib Tips

• Most AF episodes are not emergencies
• Use oral meds when possible for acute rate control of atrial fibrillation
• If proceeding with external cardioversion, change up the rhythm control plan
• Both rate control AND rhythm control options should be offered when possible
• Think dofetilide whenever considering amiodarone
• NOACs have short half lives
  – 8-13 hours if renal function normal
Conclusions

• Atrial fibrillation is most common arrhythmia
• Chronic disease
• Treatment requires addressing stroke risk and symptoms independently
• Many medical and procedural options exist for treating both stroke risk and symptoms
How will I prevent stroke?

Based on the following

What are my CHA₂DS₂ - VASc risk factors?
- Congestive heart failure?
- Hypertension?
- Age? (75 or greater)
- Diabetes?
- Stroke? (prior episode)
- Vascular disease?*
- Age? (65 - 74)
- Sex category? (female)

Will I Need
- Aspirin? (Only considered a potential treatment option for select low-risk patients**)

FDA Approved Anticoagulants?

Follow up
- Follow up and regular checkups are important for preventing congestive heart failure and stroke.

Healthy Lifestyle

Does my heart rhythm or rate need treatment?

If yes, there are 2 basic treatment considerations

Not at this time - We will monitor the situation

Yes, we will pursue keeping the heart in normal rhythm

Surgery
- Usually combined with other treatments

Cardioversion

Catheter Ablation

Medications

Medications

Yes, we will pursue heart rate control

http://www.heart.org/HEARTORG/Conditions/Arrhythmia/AboutArrhythmia/What-is-Atrial-Fibrillation-AFib-or-AF_UCM_423748_Article.jsp#.WJKnNpMrJBw