Atrial Fibrillation: Rate, Rhythm and Stroke

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I have no financial disclosures.
Objectives

- Understand arrhythmia management options for atrial fibrillation.
  - Rate versus rhythm control
- Understand anticoagulation management for atrial fibrillation.
  - Anticoagulants versus Watchman
- Know when to refer a patient for consideration of Left Atrial Appendage Closure (Watchman)
AF is a Growing Problem Associated with Greater Morbidity and Mortality

AF = most common cardiac arrhythmia, and growing

AF increases risk of stroke

- Higher stroke risk for older patients and those with prior stroke or TIA
- 15-20% of all strokes are AF-related
- AF results in greater disability compared to non-AF-related stroke
- High mortality and stroke recurrence rate

~5 M people with AF in U.S., expected to more than double by 2050

5x greater risk of stroke with AF

Current AF Treatment Options

- **Arrhythmia Management**
- **Anticoagulation Management**

And

**AF**
Current AF Treatment Options

AF

Arrhythmia Management

Anticoagulation Management

Symptoms

NO

Rate Control

YES

Rhythm Control

NO

YES

AF

Anticoagulation Management

Rate Control

Rhythm Control
Arrhythmia Management

SYMPTOMS

▶ NO
  ▶ Rate control
    ▶ Beta blockers
    ▶ Calcium channel blockers
    ▶ Digoxin
    ▶ AV node ablation and Pacemaker
  ▶ Irreversible long term

▶ YES
  ▶ Rhythm Control
    ▶ Antiarrhythmic Drugs
      ▶ Flecainide
      ▶ Propafenone
      ▶ Sotalol
      ▶ Dronedarone
      ▶ Dofetilide
      ▶ Amiodarone
  ▶ Ablation
    ▶ No cure
    ▶ Better at reducing recurrences

ANTICOAGULATION Based on CHA₂DS₂-VASc score
Not arrhythmia management
Ablation

- Consider earlier rather than later
- Paroxysmal patients have higher success
- Class I
  - Symptomatic paroxysmal AF who have not responded to or tolerated AAD
- Class IIa
  - Symptomatic, paroxysmal AF prior to trial of medical therapy
- Refer before they become persistent (AF >7 days and/or requires cardioversion to return to SR)
- Ablation does not change need for anticoagulation
  - Based on CHA$_2$DS$_2$-VASc score
Current AF Treatment Options

AF

Symptoms

Arrhythmia Management

Rate Control

Rhythm Control

Anticoagulation Management

CHA₂DS₂-VASc Score

0-1

No Anticoagulation

≥ 2

Anticoagulation NOAC Coumadin

Bleeding Risk

Watchman
Assess stroke risk with CHA\textsubscript{2}DS\textsubscript{2}-VASc score

- Score 0 male, 1 female: No anticoagulation recommended
- Score 1: Annual stroke risk 1%, oral anticoagulants or aspirin may be considered
- Score ≥2: Annual stroke risk 2%-15%, oral anticoagulants are recommended

Balance benefit vs. bleeding risk
Embolic Management/ Anticoagulation

- CHA$_2$DS$_2$-VASc score guides management
  - MDCalc.com
- Score > 2
  - Anticoagulate
    - Coumadin
    - NOAC
      - Pradaxa
      - Apixiban
      - Rivaroxaban
      - Edoxaban
  - For non valvular AF recommend NOAC over Coumadin
    - Valvular AF= Mechanical mitral valve or moderate-severe MS
  - Bleeding issue consider Watchman
Connection Between Non-Valvular AF-Related Stroke and the Left Atrial Appendage

AF Creates Environment for Thrombus Formation in Left Atrium

- Stasis-related LA thrombus is a predictor of TIA\(^1\) and ischemic stroke\(^2\).
- In non-valvular AF, >90% of stroke-causing clots that come from the left atrium are formed in the LAA\(^3\).

Challenges in Treating AF

Warfarin is not always well-tolerated

- Narrow therapeutic range (INR between 2.0 – 3.0)
- Effectiveness is impacted by interactions with some foods and medications
- Requires frequent monitoring and dose adjustments

Major Complications

- Major bleeding with warfarin use is estimated to occur at a frequency as high as 16%²
- Warfarin associated bleeding experience a rate of mortality hospitalization, life threatening disability or intervention as high as 90%²

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1. Eligible patients using warfarin
2. Eligible patients not using warfarin
3. Time in therapeutic INR
4. Outside therapeutic INR

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Arch Intern Med, 2007;167(13)
NEJM 2009;361(12)
Case

- BC is a 78 Y male with history of chronic atrial fibrillation s/p PM
- Previously on coumadin c/b spontaneous SDH when INR was 2.8
- Coumadin is now held.
- CHADSVASC score is 4 (age, HTN, atherosclerosis of aorta)
  - 4% per year adjusted stroke rate
- HASBLED score is 3 (age, bleeding history, medications to predispose to bleeding)
Treatment Options

Before 2015, what would you do?

A. Continue on aspirin only knowing patient is at 4% risk per year for embolic stroke

B. Retry Coumadin again knowing patient is at very high risk for repeat SDH

C. Treat with new oral anticoagulant like pradaxa or apixiban or rivarouxaban? Still is at risk for repeat SDH but may be less than Coumadin. GI bleeding is increased.
Treatment Options

▶ After March 2015 what would you do?

▶ A. Continue on aspirin only knowing patient is at 4% risk per year for embolic stroke

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▶ C. Treat with new oral anticoagulant like pradaxa or apixiban or rivarouxaban? Still is at risk for repeat SDH but may be less than Coumadin. GI bleeding is increased.

▶ D. Refer for left atrial appendage occlusion device
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D. Refer for left atrial appendage occlusion device
LAAO Devices

- Watchman
  - FDA approved March 2015
  - Device is deployed in the left atrial appendage via transeptal puncture
  - Requires anticoagulation pre and post procedure
  - Does not electrically isolate the left atrial appendage
LAAO Rationale

- 90% of embolism come from the LAA
- If we occlude (occlusion devices like Watchman) or tie off (Lariat) the LAA then that will reduce the risk for stroke
- Protect AF
  - Supported hypothesis
- Prevail
  - Supported safety
- Led to FDA approval of Watchman
WATCHMAN™ Indications for Use

The WATCHMAN Device is indicated to reduce the risk of thromboembolism from the left atrial appendage in patients with non-valvular atrial fibrillation who:

- Are at increased risk for stroke and systemic embolism based on CHADS$_2$ or CHA$_2$DS$_2$-VASc scores and are recommended for anticoagulation therapy;
- Are deemed by their physicians to be suitable for warfarin; and
- Have an appropriate rationale to seek a non-pharmacologic alternative to warfarin, taking into account the safety and effectiveness of the device compared to warfarin.

WATCHMAN is **not** intended to be a broad replacement for Oral Anticoagulants (OAC).
WATCHMAN LAA Closure Technology - P130013

ANCHORS

THREADED INSERT
Case BC

- Are at increased risk for stroke and systemic embolism based on CHADS<sub>2</sub> or CHA<sub>2</sub>DS<sub>2</sub>-VASc scores and are recommended for anticoagulation therapy
  - Yes - Chadsvasc score 4
- Are deemed by their physicians to be suitable for warfarin
  - Yes - cleared by neurology for short term coumadin
- Have an appropriate rationale to seek a non-pharmacologic alternative to warfarin, taking into account the safety and effectiveness of the device compared to warfarin
  - Yes - is at increased risk for rebleeding with long term warfarin and new oral anticoagulants
Watchman Procedure

- Under general anesthesia
- TEE probe throughout the procedure
- Fluoroscopically guided
- One venous puncture via right femoral vein
Device released when position confirmed
TEE Guided Transeptal Puncture
Evaluating LAA
LAA Arteriogram
Deployment of the Watchman Device
Post Depolyment Arteriogram
Tug Test
Post Deployment
Detaching the Device
Clinical Trial Device Arm Drug Protocol

* Cessation of warfarin is at physician discretion provided that any peri-device flow demonstrated by TEE is ≤ 5mm. Before 6 months, when seal is adequate, patients can cease warfarin and should begin clopidogrel 75 mg daily and increase aspirin dosage to 300-325 mg daily. This regimen should continue until a total of 6 months have elapsed after implantation.

Holmes, DR et al. JACC 2014; 64(1):1-12. WATCHMAN DFU.
Implant Success & Warfarin Cessation

**PROTECT AF**
- Implant success: 91%

**CAP**
- Implant success: 94%

**PREVAIL**
- Implant success: 95%

**Warfarin Cessation**

<table>
<thead>
<tr>
<th>Study</th>
<th>45-day</th>
<th>12-month</th>
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</thead>
<tbody>
<tr>
<td>PROTECT AF</td>
<td>87%</td>
<td>&gt;93%</td>
</tr>
<tr>
<td>CAP</td>
<td>96%</td>
<td>&gt;96%</td>
</tr>
<tr>
<td>PREVAIL</td>
<td>92%</td>
<td>&gt;99%</td>
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Implant success defined as deployment and release of the device into the left atrial appendage.

**PREVAIL Implant Success**

No difference between new and experienced operators.

- Experienced Operators:
  - n=26
  - 96%
- New Operators:
  - n=24
  - 93%
  - \( p = 0.28 \)

Long Term PROTECT AF
All-Cause Mortality

Event free probability (%)

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<thead>
<tr>
<th>Year</th>
<th>WATCHMA</th>
<th>N</th>
<th>Control</th>
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<tbody>
<tr>
<td>0</td>
<td>463</td>
<td>389</td>
<td>389</td>
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<tr>
<td>0.5</td>
<td>404</td>
<td>394</td>
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<td>341</td>
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<td>4.5</td>
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Circulation. 013;127:720-729.
Long Term Data/Meta Analysis

- LAAC similar benefit to warfarin for primary efficacy endpoint (stroke, SE, CV death)
- LAAC improvement in survival, particularly from freedom from CV death
- All cause bleeding similar
  - Exclude procedure related bleeding, then bleeding was higher in the coumadin group
- All cause stroke rates similar but
  - Warfarin patients have more hemorrhagic strokes
  - LAAC patients have more ischemic strokes
    - Strokes from other sources

Major Complication Rates Across Watchman Clinical Studies

Procedural Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Aggregate Clinical Data</th>
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</thead>
<tbody>
<tr>
<td>Number of Procedures</td>
<td>6,720</td>
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<tr>
<td>Implantation Success, %</td>
<td>94.9%</td>
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</table>

Complication Rates

<table>
<thead>
<tr>
<th>Complication</th>
<th>Rate</th>
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<tbody>
<tr>
<td>Pericardial Tamponade</td>
<td>1.24%</td>
</tr>
<tr>
<td>Procedure-Related Stroke</td>
<td>0.18%</td>
</tr>
<tr>
<td>Device Embolization</td>
<td>0.25%</td>
</tr>
<tr>
<td>Procedure-Related Death</td>
<td>0.06%</td>
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Summary

- Previous studies and registries have shown
  - the noninferiority of the LAAC device to warfarin for stroke or systemic embolism
  - its superiority in reducing hemorrhagic stroke, cardiovascular mortality, and nonprocedure-related bleeding
- The device has been found to result in improved quality of life
- Procedural success rates remain high
- Overall, procedural complications are low
- For patients who cannot tolerate long term anticoagulation, Watchman is an excellent alternative to consider
Watchman Pitfalls

- Requires anticoagulation pre and post with Coumadin or NOAC
- ASAP II Trial pending
  - Evaluate Watchman device with asa and Plavix only
- Not applicable to all shapes and sizes of LAA
- Alternatives
  - Amulet (St. Jude)
  - Coherex Wavecrest (Coherex Medical)
  - Lariat procedure
  - Atri Clip
THANK YOU!!