Atrial Fibrillation Update
Don’t Miss a Beat
ACEP
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Atrial Fibrillation is Common

- #1 sustained cardiac arrhythmia
- > 3,000,000 patients
- 1% of US population
- 9% of all those ≥ 80 yo
- AFib ED visits ↑ 33% in past 5 years

5 Step ED Dx - Rx

- Secure ABCs, with rate control if needed
- Beta Blocker vs Diltiazem
- Determine etiology
- Establish stroke risk (CHA2DS2-VASc)
- Cardiovert, admit or D/C on meds

5 Causes of Atrial Fibrillation

- Pericardium
- Myocardium
- Endocardium
- Pulmonary
- Hypersympathetic
There Are 5 Causes of Atrial Fibrillation

- Pericardium: Pericarditis
- Myocardium: LVH, Myocarditis
- Endocardium: Endocarditis, valvular disease
- Pulmonary: PE, pulmonary hypertension
- Hypersympathetic: Cocaine, amphetamines, hyperthyroid, ETOH withdrawal, caffeine, beta agonists, fever, dehydration

There Are 5 Types of Atrial Fibrillation

- Paroxysmal: Terminates spontaneously < 7 days
- Persistent: > 7 days of continued AF
- Long Standing: 1 year or more
- Loan AF: No risk factors and < 60
- Recurrent: Repeated episodes often subclinical and not recognized

There Are 5 Routine Tests for All New AF Patients

- CBC
- BMP
- Thyroid
- CXR
- Echocardiogram (sooner or later)

Consider Additional Tests

- BNP: R/O HF
- Troponin: R/O ACS
- Exercise Testing: WPW, Inducible, ACS

Afib = ↑↑ Stroke Risk
Atrial Fibrillation Equals an Increased Stroke Rate

- About 0.5-1% per year but can be higher
- 5% if no anticoagulation
- CHA2DS2-VASc – important determinant
- Silent cerebral ischemia by CT/MRI is 20-40%
- AF doubles risk of death from age 55 onward (2.2/1.42 F/M)

Always Calculate the Patient’s Score

<table>
<thead>
<tr>
<th>CHA2DS2-VASc Score</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHF</td>
<td>1</td>
</tr>
<tr>
<td>Hypertension</td>
<td>1</td>
</tr>
<tr>
<td>Age ≥ 75</td>
<td>2</td>
</tr>
<tr>
<td>Age 65 – 74</td>
<td>1</td>
</tr>
<tr>
<td>Diabetes Mellitus</td>
<td>1</td>
</tr>
<tr>
<td>Stroke/ TIA/Thromboembolic</td>
<td>2</td>
</tr>
<tr>
<td>Vascular DSX (AMI, PVD, Aortic Plaques)</td>
<td>1</td>
</tr>
<tr>
<td>Sex Female</td>
<td>1</td>
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</tbody>
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Stroke Risk and CHADS2 Score

Stroke Is The Biggest AF Risk

- 5% year if no anticoagulation
- 10% year if prior CVA or TIA
- Anticoagulation decreases CVA risk by at least 2/3
Rate vs Rhythm Control

- Classic article, 4,060 pts, multicenter
- Average age 70 yo ± 9
- Rate controlled patients had less hospitalizations
- More adverse effects in the rhythm group
- Slightly more deaths too (p = ns; 0.08)

In General: Rate Control is Superior to Rhythm Control

But maybe rate control is not always best for some ED patients

ED Rate vs. Rhythm Control

- Meta-analysis of 4 ED relevant studies
- 1438 patients with new onset AF
  - **Rate control** if older, chronic AF
  - **Rhythm** > rate control if < 65 yo and healthy

Rhythm Control
Younger, healthier patients do better with therapy directed at keeping them in sinus rhythm

Rate Control
Older, sicker patients do better with their AF rate controlled

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Rate Control in AF

- **Calcium Channel Blockers**
  - **Diltiazem** 25 mg over 1-2 min
    May ↑ to 35 mg over 1-2 min if inadequate response after 5 min

- **Beta Blockers**
  - **Metoprolol** 5 mg IV q 5 min up to 3 doses
  - **Esmolol** 0.5 mg/kg over 1 min 0.05 – 0.1 mg/kg/min titrate to effect

Rate Control for AF with RVR

- Although cardiologists seem to prefer Metoprolol, Diltiazem is as good or better for AF with RVR
- No increased toxicity
- Be careful with dosing
- Older, frailer patients should get less

Take Homes

European Heart 2013;34:1481-88; 1489-97

- The role of Digoxin in Atrial Fibrillation is controversial – it may increase mortality or be a marker for those who will do badly regardless of its use
- In general – don’t be the one to start it

ED Rhythm Control
Cardioversion of Atrial Fibrillation

Safety of ED Cardioversion

- Very safe if no thrombus
- Risk of CVA increases over time
- TEE required if onset unknown or > 48 hrs
- New evidence suggests maybe > 12 hrs

Risk of CVA S/P Cardioversion without anticoagulants
0-48 hrs onset = 0.7%
ED Conversion of Atrial Fibrillation

- Medical followed by electrical
- Medication is effective in about 50%-80%
- Electricity is 86%-90% effective
- Not if significant underlying disease (HF, pneumonia, ACS, etc.)
- Must be less than 48 hrs of AFib

Pharmacological Cardioversion

- Used Procainamide (180 pts, 62% of total)
- 500 mg then, if needed, to 1,000 mg
- 50% converted pharmacologically
- 500 mg converted 44%, 56% took 1,000 mg
- Not if prolonged Q-T or Hypotensive

How safe and effective is pharmacological cardioversion of Atrial Fibrillation?

- 236 consecutive Austrian AFib pts
- All with AFib with onset < 48 hrs
- Average age 66.8 ± 11.8; 30 day follow up
- CHA2DS2-VASc ≥ 2 in 80%!!
- Mainly used Ibutilide, Vernakalant and Flecainide

Results

- All anticoagulated with LMWH pre-medication
- 72.5% converted with first medication
- Same efficacy for Ibutilide, Vernakalant and Flecainide
- One stroke within 30 days
Vernakalant Results

- 68 pts with 79.4% effectiveness
- 2.1% toxicity; 1 hypotension, 1 bradycardia, 1 AMS
- A new potential non-electrical effective therapy

Electrical Conversion

Cardioversion for Fib/Flutter

- AHA recommends 120-200J biphasic
- 50-100J for flutter
- My bias: Use highest recommended
- AP or AL – your choice
- Switch positions if unsuccessful

Anticoagulation Pre Cardioversion

- If CHA₂DS₂-VASc = 0 not needed pre or post
- TEE all others
- If no TEE = 3 weeks pre cardioversion

Neither A-P nor A-L Pad Placement is Superior

- Meta-analysis 13 studies
- 836 AP pts vs 856 AL pts
- Trend toward AL > AP if biphasic

Who Needs an Echo in AF

- Transesophageal (TEE) not Transthoracic
- Used to R/O thrombus pre cardioversion
- Mandatory if sx > 48 hrs or unknown
- May be used if > 12 hrs or older pts
- Not required in younger healthy pts if onset is acute and heralded by specific symptoms
“We conclude that it would be within the standard of care to discharge home stable patients with AFib after cardioversion with adequate follow-up”...“The return rate for relapsed AFib is 3%-17%”

**CHA$_2$DS$_2$-VASc**  
- 0  
- 1  
- 2  

**Agent**  
- 0  
- NOAC or discuss  
- NOAC or Warfarin

NOACs now endorsed in ACC/AHA guidelines.  
Check carefully for use/dosage in CRF, valvular disease, obese, fluid and s/p cardioversion

**NOACs, DOACs**  
**Novel Oral Anticoagulants**  
Direct Oral Anticoagulants  
- Apixaban  Eliquis anti-xa  
- Dabigatran  Pradaxa direct antithrombin  
- Edoxaban  Savaysa anti-xa  
- Rivaroxaban  Xaralto anti-xa
Is apixaban safer than warfarin in complicated patients on multiple other medications?

- 18,201 Afib pts, apixaban vs warfarin
- Divided pts into ≤ 5 drugs, 6-8, ≥ 9 drugs
- Average age 69
- Converted with 3 mg/kg of vernakalant over 10 min
- More drugs = worse outcomes

**Take Homes**

- 21% less strokes with apixaban (1.27% per yr vs 1.60%)
- 31% less major bleeding (2.13% per yr vs 3.09%)
- 11% lower mortality (3.52% / yr vs 3.94%)

Warfarin use is decreasing and is becoming relegated to mainly those patients with:

- Mechanical Heart Valves
- Mitral Stenosis
- Chronic Renal Failure

**Anticoagulation for AFib**

- **Warfarin:** INR 2-3; not < 2
- **Apixaban:** 5 mg BID
- 2.5 mg BID < 60 kg, > 80 y, Cr > 1.5
- **Edoxiban:** 60 mg QD > 60 kg
- 30 mg QD > 30 kg
- Not for pts CrCl > 95
- **Dabigatran:** 150 mg BID if CrCl > 30
- **Rivaroxaban:** 20 mg / d
- 15 mg / d if CrCl 30-49
How often do we not follow current recommended anticoagulation guidelines for high risk Afib patients?

- Two populations: CHADS$_2$ $\geq$ 2 and CHADS$_2$VASC $\geq$ 2
- 38.2% of 210,380 CHADS$_2$ $\geq$ 2 got only ASA
- 40.2% of 294,642 Chads$_2$VASC $\geq$ got only ASA
- More than 1 in 3 high risk for stroke AF pts treated below the standard of care!

EM MDs need to pay close attention to CHA$_2$DS$_2$-VASc scores

- Anticoagulants started in ED increase compliance and decrease stroke risk
- Don’t discharge patients without considering the need to begin anticoagulation

Should you always provide rate control in borderline sick patients with Atrial Fibrillation?

- 416 patients with AF
- All patients had “complex” AF
- Complex = an acute underlying illness
- 2 Canadian University affiliated EDs

Major Complications

- Shock requiring vasopressors
- Intubation or NIPPV
- Bradycardia requiring pacing or meds
- Stroke or embolic complication
- CPR or death
Major Adverse Complications

Rate or Rhythm Control Attempted vs. No Rate or Rhythm Control

Total Adverse Events

Rate or Rhythm Control Attempted vs. No Rate or Rhythm Control

Effective Rate Control (> 20 BPM)

Control Attempted vs. No Attempt at Control

(Elec, D,1+, BB) (Crystalloid, Bronchodilator)

Emergency Department Patients With Atrial Fibrillation or Flutter and an Acute Underlying Medical Illness May Not Benefit From Attempts to Control Rate or Rhythm

Complication Rate vs. Effectiveness

- 60% (9/15) had cardiovascular complications
- 26.7% (4/15) had medication complications
- 19.0% had pulse reduction of 20 BPM with medical control
- 20% (3/5) had successful electrical conversion

Trying to Control AF in Sick Patients

Take Homes

- Rarely effective
- Dangerous
- Focus on underlying disease before attempting to control rate or rhythm

In Closing
AF Rate Control in Complex Patients

Take Homes

• Treat the underlying disease(s)
• It’s dangerous to try to control rate immediately
• Beware underlying sepsis, dehydration, HF
• Beta blockade + HF = ↑ ETI

Older pts and higher CHADS2 scores often denote who has an underlying cause of AF with RVR

The Best Single Current Cardiology Reference

• Definitive recommendations from AHA-ACC
• 201 references, up to 2014
• Every possible table & resource

The Best Single Current EM Reference

• Authoritative review
• ED focused
• 48 references including from 2015

Always Calculate the Patient’s Score

CHA2 DS2-VASc

• CHF (1)
• Hypertension (1)
• Age ≥ 75 (2)
• Age 65 – 74 (1)
• Diabetes Mellitus (1)
• Stroke/ TIA/ Thromboembolic (2)
• Vascular DSX (AMI, PVD, Aortic Plaques (1)
• Sex Female (1)

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Always Become expert in using one

NOACs are here
### Summary

- **Atrial Fibrillation is common**
- **Stroke is high risk**
- Always calculate CHA$_2$DS$_2$-VASc score
- Anticoagulate if indicated
- 2 = yes, 0 = no, 1 = yes or discuss

### Summary

- Treat underlying conditions
- Dilt or BB for rate control
- Cardioversion can be safe < 12-48 hrs
- Antiarrhythmics convert 50-80%
- 200 Joules biphasic works 90%

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