Atrial Fibrillation (AF) is a supraventricular tachyarrhythmia caused by uncoordinated atrial activation and associated with irregular ventricular response. It carries with it an increased risk of thromboembolism and stroke (4.5% per year), for which anticoagulation is the treatment of choice.

ECG shows irregular RR intervals, and no distinct P waves.

Overview

Atrial Fibrillation (AF) is a supraventricular tachyarrhythmia caused by uncoordinated atrial activation and associated with irregular ventricular response. It carries with it an increased risk of thromboembolism and stroke (4.5% per year), for which anticoagulation is the treatment of choice.

History

SYMPTOMS: palpitations, dyspnea, dizziness, focal neurological deficit, fatigue, effect on ADLs
SEVERITY: impact on quality of life, Canadian Cardiovascular Society Severity in AF (CCS-SAF) score
PATTERN: new onset, paroxysmal (recurrent AF that terminates spontaneously, possible up to 7 days, usually <48h), persistent (sustained >7 days), permanent

ETIOLOGY:
- Cardiac: CAD/prior MI, CHF, valvular disease, pericardial disease, SSS, SVT, post-OR, genetic
- Pulmonary: COPD, pneumonia, PE, Pulmonary HTN
- Endocrine: hyperthyroidism
- Other: exercise, alcohol

OTHER FACTORS:
- reversible causes: e.g. hyperthyroidism, ventricular pacing, SVT, exercise
- identify factors in which tx could reduce recurrent AF/improve prognosis: e.g. HTN, LV dysfunction, congenital heart disease, obstructive sleep apnea, obesity

SOC HX: alcohol, intensive aerobic exercise
FAM HX: heritable causes of AF (esp in lone AF)
HX OF PRIOR AF THERAPY - efficacy, side effects, tolerability
THROMBOEMBOLIC RISK - CHADS2 or CHA2DS2 VASc

<table>
<thead>
<tr>
<th>CHADS2</th>
<th>CHADS2 Score</th>
<th>Stroke Risk/yr</th>
<th>CHA2DS2 VASc</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHF (+1)</td>
<td>0</td>
<td>1.9%</td>
<td>CHADS2=0-1</td>
</tr>
<tr>
<td>HTN (+1)</td>
<td>1</td>
<td>2.8%</td>
<td>CHF (+1)</td>
</tr>
<tr>
<td>Age 75+ (+1)</td>
<td>2</td>
<td>4%</td>
<td>HTN (+1)</td>
</tr>
<tr>
<td>DM (+1)</td>
<td>3</td>
<td>5.9%</td>
<td>Age 75+ (+2)</td>
</tr>
<tr>
<td>Stroke/TIA/TE hx (+2)</td>
<td>4</td>
<td>8.5%</td>
<td>DM (+1)</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>12.5%</td>
<td>Stroke/TIA/TE hx (+2)</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>18%</td>
<td>Vasclar dx (+1)</td>
</tr>
</tbody>
</table>

BLEEDING RISK: to guide antithrombotic therapy
HAS-BLED score calculator: http://www.mdcalc.com/has-bled-score-for-major-bleeding-risk/

Physical Exam

- BP, HR & rhythm, Ht, Wt, JVP, comprehensive precordial exam, carotid and peripheral pulses – for structural heart disease, signs of hypo/hyperthyroidism, respiratory exam - presence of basilar crackles, edema

Tests

1. 12-Lead ECG (electrocardiogram) - At initial presentation and to assess efficacy of rate or rhythm control
2. Transesophageal Echo (TEE) - no atrial clot if doing cardioversion in pt not on oral anticoagulant
3. Labs: CBC, INR, PTT, Cr, electrolytes, TSH, ALT/AST, Albumin, Bilirubin, Fasting lipids & glucose, (+/-Ca, Mg)
4. Extra Tests – depending on clinical scenario

Dr. Michael Evans developed the One-Pager concept to provide clinicians with useful clinical information on primary care topics.
ATRIAL FIBRILLATION

Management

There are 2 main goals of management: prevent arrhythmia recurrence, or substantially reduce the overall arrhythmia burden and reduce the risk of thromboembolic events.

1. Treat etiology/triggers and risk factors (i.e. TSH, HTN, CHF, alcohol use)

2. Management of rhythm disturbances: rate vs. rhythm control

Rate control (goal resting HR <100bpm) is generally preferred because it has less adverse events than those associated with antiarrhythmic drugs, it allows for simplification of the drug regimen, and has a lower cost. However, for the following patients, rhythm control may be preferred: younger patients, new/paroxysmal AF, more symptomatic AF, or if CHF is exacerbated by AF.

<table>
<thead>
<tr>
<th>RATE Control Drug</th>
<th>Dose</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beta-blocker (e.g. Metoprolol, Propranolol)</td>
<td>50-200 mg/day (80-240 mg/day)</td>
<td>1st choice if MI, LV sys dysfunction; SE: bradycardia, low BP, depression, fatigue</td>
</tr>
<tr>
<td>Non-DHP CCB (Diltiazem, Verapamil)</td>
<td>120-360 mg/day</td>
<td>SE: bradycardia, low BP, ankle swelling</td>
</tr>
<tr>
<td>Digoxin</td>
<td>0.125-0.25mg po daily</td>
<td>Indicated in patients with heart failure, LV dysfunction, or for sedentary individuals; requires drug level monitoring; many drug interactions SE: bradycardia, N/V, visual disturbances, Digitalis toxicity</td>
</tr>
</tbody>
</table>

RHYTHM Control Drugs*: Dronedarone, flecainide, propafenone IR, sotalol, amiodarone

*Rhythm Control: requires anticoagulation to reduce stroke risk

3. Stroke/Thromboembolic Prevention

In the absence of antithrombotic therapy, the risk of stroke increases by about a factor of 1.5 for each unit of increase in the CHADS2 score. The HAS-BLED score can be used to guide therapy and understand bleeding risk but should not be used as an absolute contraindication for antithrombotic therapy.

CHADS2 = 0: ASA 75-325mg/day; none if young and no stroke risk; consider Oral Anticoagulant (OAC) if age 65+ or female with vascular disease; use CHADS-VASc to guide therapy for CHADS2 = 0 or 1

CHADS2 = 1: OAC (ASA may be considered in selected patients depending on risk:benefit)

CHADS2 ≥ 2: OAC

4. Oral Anticoagulants

<table>
<thead>
<tr>
<th>Oral Anticoagulant</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Dabigatran</td>
<td>150mg po BID CrCl &gt;30-50ml/min or age ≥80y: 110mg BID CrCl &lt;30ml/min: Avoid use</td>
<td>Same efficacy as warfarin, if not better in some cases; all associated with lower rates of intracranial hemorrhage (ICH) compared with warfarin in phase 3 trials. New OACs are not indicated for mechanical valvular AF. No anticoagulation should be initiated until a level is achieved.</td>
</tr>
<tr>
<td>Rivaroxaban</td>
<td>20mg po once daily (OD) CrCl 15-50ml/min: 15mg po OD CrCl &lt;15ml/min: Avoid use</td>
<td>Same efficacy as warfarin, if not better in some cases; all associated with lower rates of intracranial hemorrhage (ICH) compared with warfarin in phase 3 trials. New OACs are not indicated for mechanical valvular AF. No anticoagulation should be initiated until a level is achieved.</td>
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<tr>
<td>Apixaban</td>
<td>5mg po BID if patient has any 2 of the following: age &gt;80y, Wt&lt;60kg, CrCl &lt;100ml/min: 2.5mg po BID</td>
<td>Same efficacy as warfarin, if not better in some cases; all associated with lower rates of intracranial hemorrhage (ICH) compared with warfarin in phase 3 trials. New OACs are not indicated for mechanical valvular AF. No anticoagulation should be initiated until a level is achieved.</td>
</tr>
<tr>
<td>Warfarin</td>
<td>Dose to maintain INR of 2-3 (2.5-3.5 in patients with mechanical mitral heart valves)</td>
<td>Mechanical valve: must use warfarin. Preferred in compromised renal function, severe rheumatic valvular disease, patients with poor adherence as it allows for more frequent monitoring of therapy</td>
</tr>
</tbody>
</table>

4. Referrals

Cardiologist – most patients
Electrophysiologist – patients ≤35y or failed medical management: for consideration of ablation

5. Emergency Management – Recent Onset AF

1. Unstable due to AF – immediate electrical cardioversion: 150-200J biphasic waveform
2. Stable, AF <48h – pharmacologic or electrical cardioversion

Pharmacologic Cardioversion: Propranolol 150mg/kg IV over 1h (5% hypotension risk); Propafenone 450-600mg po x1 or Flecainide 300-400mg po x1 (Risks: hypotension, 1:1 flutter, bradycardia; avoid in structural heart dx; use with BB or CCB); Ibutilide 1-2mg IV over 10-20min; pretreat with MgSO4 1-2mg IV (2.5-3.5 in patients with mechanical mitral heart valves)

-If 1 or 2 successful and 1st episode – no antithrombotic
-If recurrent episode of AF – start indefinite antithrombotic per CHADS2
-If unsuccessful cardioversion: go to 3

3. Stable, AF >48h or unknown duration, or high-risk pt for stroke (mechanical valve, rheumatic HD, prior stroke/TIA)

-Rate control (IV diltiazem, metoprolol, verapamil, or digoxin), then
-If recurrent episode of AF – start indefinite antithrombotic per CHADS2
-TEE guided cardioversion (OAC initiated with Heparin bridging)
-If unsuccessful cardioversion:
-If recurrent episode of AF – start indefinite antithrombotic per CHADS2
-If unsuccessful cardioversion:

Bottom Line

Atrial fibrillation is a supraventricular tachyarrhythmia that has a 0.95% prevalence among adults >20 years of age. Treatment is multifactorial, often requiring multiple pharmacological agents for rate or rhythm control and to reduce TE risk. In AF, anticoagulation is guided by the CHADS2/CHADS2-VASc and HAS-BLED scores. Newer OAC agents which do not require INR monitoring are now available for the treatment of non-valvular AF. However caution must be exercised in the treatment of elderly and those with renal dysfunction when initiating a newer anticoagulant.

References can be found online at http://www.dfcm.utoronto.ca/programs/postgraduateprograme/One_Pager_Project_References.htm