Atrial Fibrillation Management Across the Spectrum of Illness

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Disclosures
- NONE

Objectives
- Discuss the pathophysiology, diagnosis, and management of atrial fibrillation
  - Outpatient
  - Inpatient
  - Critical care

AF
- Over 2 million people in US
- Increases with age
  - 10% of population over 80 yo
- Morbidity
  - 15% of strokes; leading cause of embolic strokes
  - 66% increase in hospitalizations over 20 years
  - Increased risk of heart failure
  - Increased all cause mortality

Is it different in acute care?
- SOMETIMES
  - Presentation
  - Pathophysiology
  - Workup
  - Treatment
  - Follow-up

“Typical” AF
PRESENTATION
- Office or Emergency Department
  - Palpitations / fast pulse
  - Shortness of breath
  - Decreased activity / exercise tolerance
  - Lightheadedness / near syncope
  - Chest pain
“Typical” AF Presentation

- Physical Exam
  - Irregularly irregular pulse
    - Pulse rate may not equal heart rate
  - Variable S1
  - JVP

“Typical” AF Presentation

“Typical” AF Pathophysiology

AF Classification

- Paroxysmal – end <7 days
- Persistent – last > 7 days
  - May terminate on its own or by cardioversion
- Permanent - > 1 year and cardioversion has not been attempted or failed
- Lone AF – any of the above without structural heart disease
- Only applies to AF unrelated to a reversible cause

“Typical” AF Pathophysiology

“Typical” AF Risk Factors

- Age > 60 (Dramatically in age >80)
- Valvular heart disease
- Hypertension
- Coronary disease
  - Post CABG surgery
- Long standing pulmonary disease (e.g. COPD)
- Hyperthyroidism
- Drugs: ETOH, Theophylline, Albuterol, Ephedra, Cocaine, Methamphetamine
**“Typical” AF WORK-UP**

- ECG
- Echocardiogram
- Pharmacologic nuclear stress test
  - Or cardiac catheterization
- Holter monitor or mobile telemetry
  - If dysrhythmia is paroxysmal
- Thyroid panel

**“Typical” AF TREATMENT**

- Rate control vs. rhythm control

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**Presumed Benefits of Maintaining Sinus Rhythm**

- Fewer symptoms / better exercise tolerance
- Lower risk of stroke
- Long-term anticoagulation may not be needed if sinus rhythm is successfully maintained
- Better quality of life
- Better survival

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**AFFIRM – Study Overview**

- Comparison of two treatment strategies for patients with atrial fibrillation needing treatment
  - Rate control and anticoagulation
  - Rhythm control and anticoagulation
- Multicenter, randomized trial
- Patients with atrial fibrillation and risk factors predicting a high risk for stroke and death
- Null hypothesis: survival is equal with the two treatment strategies

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**Initial Therapy**

- **Rate arm**
  - Digoxin: 51%
  - Beta adrenergic blockers: 49%
  - Calcium channel blockers: 41%

- **Rhythm arm**
  - Amiodarone: 39%
  - Sotalol: 33%
  - Propafenone: 10%
  - Procainamide: 6%
  - Quinidine: 5%
  - Flecaïnide: 5%
  - Disopyramide: 2%
  - Moricizine: 1%

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**Warfarin Use**

<table>
<thead>
<tr>
<th>% Using Warfarin at Follow-up Visit</th>
<th>BL</th>
<th>2M</th>
<th>4M</th>
<th>1Y</th>
<th>2Y</th>
<th>3Y</th>
<th>4Y</th>
<th>5Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rate: 2027 1942 1934 1852 1726 1229 735 248</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Rhythm: 2033 1650 1933 1851 1718 1241 737 268</td>
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</table>
Typical AF Treatment

- **Rate Control**
  - Beta blockers
    - Metoprolol
  - Calcium channel blockers
    - Diltiazem
  - Digoxin

- **Rhythm Control** 20-30% remain sinus after 1 year
  - Amiodarone (heart failure pts)
  - Propafenone, sotalol, dronedarone, flecainide, dofetilide

Anticoagulation

<table>
<thead>
<tr>
<th>CHADS, Risk Criteria</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>C Congestive heart failure</td>
<td>1</td>
</tr>
<tr>
<td>H Hypertension — blood pressure consistently above 140/90 mmHg (or treated hypertension on medication)</td>
<td>1</td>
</tr>
<tr>
<td>A Age ≥ 75</td>
<td>1</td>
</tr>
<tr>
<td>D Diabetes mellitus</td>
<td>1</td>
</tr>
<tr>
<td>S Prior Stroke or TIA or Thromboembolism</td>
<td>2</td>
</tr>
</tbody>
</table>

“Typical” AF Treatment

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    - Metoprolol
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### Functional Status and Quality of Life

- **Functional Status**
  - 6-minute walk
  - NYHA CHF class
  - CCS angina class
- **Quality of Life**
  - SF – 36
  - Symptom checklist
  - Ladder of Life
  - Quality of Life Index

No differences between rate and rhythm control arms
"Typical" AF TREATMENT

- ANTICOAGULATION
  - warfarin (INR 2.0 – 3.0)
  - dabigatran 75-150 mg BID (DTI)
  - Rivaroxaban 15-20 mg QD (Xa inhibitor)
  - Apixiban 2-5 mg BID (Xa inhibitor)

- CARDIOVERSION
  - Afib < 48 hours:
    - No anticoagulation indicated
  - Afib > 48 hours:
    - Anticoagulate for 3-4 weeks before CV
    - OR get TEE
    - Anticoagulate for 1 month after CV

- AF ablation
- MAZE procedure

"Typical" AF FOLLOWUP

- Medication maintenance
  - Anticoagulation – INR (warfarin), renal, hepatic
  - Rate control
    - Digoxin level
    - ECG, HR
  - Rhythm control
    - Sotalol – QTc, esp with dosage changes
    - Amiodarone
    - ECG ? Q 3 months
    - Pulmonary fibrosis – annual PFTs; CXR q 3 months
    - CHF
    - Hypo or hyperthyroidism – q 6 months
    - Corneal deposits – retinopathy – annual eye exam
    - Liver dysfunction – q 6 months

Variations on “Typical”

- PRESENTATION
  - Asymptomatic
    - Even with extremely high heart rates
  - Unstable

- ETIOLOGY
  - Hyperthyroidism
  - COPD
    - Albuterol
  - Stimulants
    - Caffeine
    - Amphetamines
    - Methamphetamine
AF in Acute and Critical Care

- Evaluate and treat as ‘typical’
- Patients with known PAF or chronic AF
  - With stable dysrhythmia
- Patients presenting with AF
  - Unstable
- Patients presenting with anything else
  - New or recurrent AF during the hospitalization

AF in Acute and Critical Care

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AF in Acute and Critical Care

- Evaluate and treat as ‘typical’
  - Rate control vs. rhythm control
  - Anticoagulation
  - Telemetry, ECGs
  - TTE, TEE
  - Cardiac ischemia eval
  - Think about PE
AF in Acute and Critical Care

- Evaluate and treat as ‘typical’
- Patients with known PAF or chronic AF
  - With stable dysrhythmia

*Patients presenting with AF*

- Unstable
  - Patients presenting with anything else
    - New or recurrent AF during the hospitalization

AF in Acute and Critical Care

- Patients presenting with AF
  - Unstable
  - Symptoms due to AF or something else???
    - ? PE
    - ? MI
    - ? Heart failure
    - ? Sepsis
    - ? Any other critical illness

AF in Acute and Critical Care

- Patients presenting with AF
  - Unstable
  - Emergent cardioversion
    - Electrical
    - Chemical – ibutilide, procainamide
    - If stable after cardioversion, treat like the ‘typical’ patient for management and follow up
    - If not stable........

AF in Acute and Critical Care

- Patients presenting with AF
  - Unstable
  - Hypotension
  - Chest pain
  - Short of breath

AF in Acute and Critical Care

-Patients presenting with anything else
  - New or recurrent AF during the hospitalization
AF in Acute and Critical Care

- Patients presenting with anything else
  - New or recurrent AF during the hospitalization
    - Consider new diagnoses / complication
    - Post cardiac surgery
    - Sympathetic nervous system stimulation

AF in Acute and Critical Care

- New diagnoses / complications
  - In addition to presenting diagnosis
    - Pulmonary embolus
    - Pericarditis / pericardial effusion
    - Pneumonia
    - Fluid overload / CHF – atria stretched

AF in Acute and Critical Care

- Post cardiac surgery
  - ~ 30% incidence of atrial fibrillation
  - Etiology – physical stimulation of cardiac muscle and nerve fibers; ? Effects of CPB
  - Prophylaxis – no conclusive proof
    - Beta blockers
    - Amiodarone
    - Magnesium
    - Workup
      - None except the ECG (could check TSH)

AF in Acute and Critical Care

- Post cardiac surgery
  - Rate control – unless hemodynamic compromise from loss of atrial activity
  - Metoprolol, diltiazem – negative inotropes
  - Amiodarone – careful with dosing at discharge
  - Digoxin
  - Anticoagulate
    - When not bleeding, after chest tubes out
    - Warfarin, not heparin
  - Recurrences not unexpected – several months post op

AF in Acute and Critical Care

- Sympathetic nervous system stimulation
  - Increased HR
  - Arrhythmias
  - AF
  - WHY IS THE SNS ‘OVERREACTING’?
    - ‘fight or flight’
    - Response to acute and critical illness
    - Sympathomimetic infusions
      - Epi, norepi, dopamine, dobutamine
AF in Acute and Critical Care

- Sympathetic nervous system stimulation
- May have no cardiac history or heart disease
- Workup
  - ECG
  - Thyroid panel
  - Echocardiogram (if not already done)
  - No ischemic workup unless otherwise indicated

AF in Acute and Critical Care

- Sympathetic nervous system stimulation
- TREATMENT can be difficult
  - Sympathomimetics – wean (may not be able)
  - Beta blockers, calcium channel blockers
    - May not tolerate hemodynamically
  - Amiodarone – not great for rate control
  - Digoxin – not fast
  - Cardioversion – usually fast recurrence due to continued SNS stimulation

AF in Acute and Critical Care

- Sympathetic nervous system stimulation
- TREATMENT can be difficult
- Amiodarone
- Magnesium
- Potassium
- Cardioversion attempt if unstable
- Treat the underlying condition

- <15% are still in AF when discharged from ICU

Questions?