

Atrial Fibrillation

The High Risk Obese Patient

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A 56 year old male with a history of hypertension and chronic stable angina presents to the clinic with sudden onset of dizziness and dyspnea. This occurred several hours prior with no change in medications, physical stress or any other factors. He has been well and active, functioning at NYHA Class 1. He leads a sedentary life and notes more fatigue recently than usual. His angina has been minimal and not active for the past three months. Medications are enalapril 10mg BID, ASA 325 daily, and NTG sublingual prn.

On examination, BP 148/78, pulse 138 and irregular. His weight is 320# and height 70". He has a soft right carotid bruit, no JVD, and clear lungs. Heart is rapid and irregular with a soft systolic outflow murmur in the second interspace right.

Abdomen is obese. There are good peripheral pulses and no edema.

Questions:

1. What is the likely cause of his presentation?
2. What testing should be performed at this time?
3. Is emergent therapy indicated?
4. Does he warrant hospitalization?
5. Is long term therapy indicated?
6. Should anticoagulation be initiated?

Objectives

- Describe the common etiologies of Atrial Fibrillation and association with Obesity
- Identify the appropriate evaluation
- Discuss authoritative guidelines for evaluation and therapeutic intervention
- Describe current and evolving invasive management options

Definition

- An irregularly irregular rhythm with no discernable P waves
- Small irregular deviations of the baseline are called “f” waves
 - these may be coarse or fine
- The conduction to the ventricle may range from bradycardia to severe tachycardia

Definition cont.

- Types
 - Recurrent: more than two episodes
 - Paroxysmal: spontaneous conversion to sinus
 - Persistent: lasting greater than 7 days
 - Permanent: lasting 1 year or more with failed attempts at cardioversion
 - “Lone”: no underlying heart dysfunction or risk factors, under age 60

Epidemiology

- Found in 1% of population over 60, and 6% in population over 70
- Over 2 million persons in the USA have AF
- Somewhat more common in men than women
- With coronary disease in age group >70, incidence is 10%
- Morbid Obesity increases risk 50%

Etiology

- Ischemic Heart Disease
- Hypertension
- Morbid Obesity/ Sleep apnea
- Acute inflammation
 - pericarditis
 - pneumonia/pleuritis

Etiology cont.

- Chronic Inflammation
 - Connective tissue disorders
- Valvular heart disease
- Cardiotoxins
 - Chemotherapeutics
 - Alcohol
 - Stimulant drugs

Etiology cont.

- Thyrotoxicosis and hyperthyroidism
- Cardiomyopathy
- “Lone”
 - no discernable etiology
 - Age less than 60 years

Evaluation

- Physical findings
 - irregular rhythm
 - varying intensity of first heart sound
 - occasional pulse deficit compared to auscultated rate
 - other findings associated with etiology

Evaluation

- Screen for etiology
 - echocardiogram for valve disorder, cardiomyopathy, and pericardial effusion
 - stress testing for ischemia
 - laboratory evaluation for thyroid function, glucose, and inflammatory markers if indicated
 - Sleep study in obese patients suspected of apnea

Evaluation

- Methods to identify the occurrence of fibrillation if not present at time of examination
 - 24 hour Holter monitoring
 - 30 day Event recorder
 - Continuous loop recorder
 - Implanted continuous recorder

Therapeutic Approach

- Reverse reversables
 - Control hypertension
 - Revascularize if needed
 - Weight loss and CPAP if indicated
 - Control inflammation
 - Normalize thyroid function

Therapeutic Approach

- Three major objectives
 - Control rate while patient remains in fibrillation
 - Convert rhythm to sinus
 - Prevent thromboembolism

Rate Control

- Any agent that reduces AV node conduction will slow the ventricular response
 - Digoxin
 - Beta Blocker
 - Verapamil
 - Diltiazem
 - Amiodarone

Rate Control

- This option is selected when underlying etiology cannot be reversed
- Also appropriate when patient has been in persistent fibrillation for more than 3 months
 - rate of recurrence >50% at one year and 80% at three years if cardioversion attempted

Rate Control

- Therapeutic options: acute
 - IV beta blocker propranolol, metoprolol, atenolol, esmolol
 - IV diltiazem
 - IV verapamil
 - IV digoxin
 - Adenosine of little use due to short duration of effect

Rate Control

- Therapeutic options: chronic
 - Oral beta blocker. NOT carvedolol
 - Oral digoxin: must evaluate heart rate in exercise if used alone. Likely will not be adequate
 - Oral diltiazem
 - Oral verapamil
 - Oral Amiodarone

Conversion to Sinus

- If patient hemodynamically unstable, immediate conversion required
 - Electrical preferred
 - Medical options
- Address and stabilize causational factors
- Success less with significant enlargement of LV, LA or RA, or with significant valve disease

Conversion cont.

- Electrical
 - Bipolar countershock most effective at lower energy
 - Sedation required
 - Rare serious complication
 - Ventricular fibrillation
 - Cardiac standstill
 - Embolization

Conversion cont.

- Electrical, cont
 - 85% successful initially
 - Reversion to fibrillation most frequent within 24 hours
- Patient may develop first or second degree burn at pad sites
- If unsuccessful or if recurs, may repeat with pretreatment with antiarrhythmic

Conversion cont.

- Medical
 - Intravenous
 - Ibutilide bolus X2
 - Dofetilide
 - Amiodarone
 - Oral
 - Dofetilide
 - Flecainide
 - Propafenone

Conversion cont.

- Cautions with medical conversion
 - All agents except amiodarone increase risk of ventricular proarrhythmia in patients with reduced LV function or chamber dilation
 - Sotalol and amiodarone may be used safely as outpatient therapy, but all others must be used in hospital with telemetry monitoring
 - All agents may prolong QTc, so screen for other agents that may worsen this (H2 blockers, tricyclics, etc)

Maintenance of Sinus

- Long term success of conversion varies depending on etiology and duration of fibrillation
- Low risk patients: (one or no risk factors)
 - No antiarrhythmic indicated
- Higher risk patients: (more than one risk factor or prior episode)
 - Antiarrhythmic indicated
 - Recurrence rate still approaches 50% at one year
- With advanced AV node disease, antiarrhythmics should not be used without permanent pacemaker

Maintenance of Sinus, cont

- Medical options
 - Verapamil/diltiazem: low and moderate risk patients with normal LV function
 - Amiodarone: statistically best for maintenance in all risk groups
 - Sotalol: nearly as effective as amiodarone, but cannot be used in patients with heart failure
 - Dofetilide, Dronedarone, Propafenone in patients with no LV dysfunction

Prevention of Thrombosis

- Clinically most important risk of atrial fibrillation is thrombosis and embolus, especially cerebral
- Highest risk
 - Rheumatic or other significant valvular disease
 - Dilated LA or LV with cardiomyopathy
 - Prior embolic event

Thrombosis Risk

- Risk of embolus
 - 14% annual risk in highest group
 - 7% annual risk in general group
 - <1% risk in Lone A-Fib

Thrombus Prevention

- Multiple randomized trials over the past ten years clearly indicate the benefit of anticoagulation. Risk reduction by 60%
- Requires warfarin anticoagulation to an INR level of 2.0 to attain best reduction
- Risk of bleed when carefully monitored is less than 3% per year in patients under 70years of age

Thrombus Prevention

- Anticoagulation not indicated:
 - bleeding disorder
 - history of hemorrhage
 - compliance problems
 - CNS tumor
- Alternative in these cases is Aspirin therapy at 325-650mg daily. Risk reduction 30%

Thrombosis Prevention

- In chronic afib, coumadin may be held for up to 1 week for procedures
- If anticoagulation must be held for more than one week, heparin should be initiated
- ASA, if required for other reasons, may be combined with warfarin with small increase bleeding risk
- Clopidogrel or Prasugrel, if required, may be used in combination but the risk of bleeding is significantly increased.

Thrombosis Prevention

- If thromboembolic event occurs with INR at target, new target INR of 3-3.5 should be established before adding platelet inhibitors
- Use of Dabigatran approved in nonvalvular atrial fibrillation, but recommendations on dose adjustments with concomitant use of platelet agents are not well defined

Interventional Therapy

- AV Node ablation with permanent pacemaker
 - Indicated for refractory afib with uncontrollable rapid rate response
- Catheter Ablation
 - Newer techniques enable success at 60-70%
 - Still requires anticoagulation

Interventional Therapy

- Surgical occlusion of atrial appendage at time of valve or bypass surgery
- Transcatheter occlusion of atrial appendage with mesh device
- Surgical atrial ablation: Maze procedure
 - Effective at time of valvular surgery

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