Rhythm Control: Is There a Role for the PCP?

Blake Norris, MD, FACC
BHII Primary Care Symposium
February 28, 2014
Financial disclosures

Consultant    Medtronic
3 reasons to evaluate and treat arrhythmias

- Eliminate symptoms
- Prevent imminent death and hemodynamic collapse due to a life-threatening arrhythmia
- Reduce possible risks other than the direct effect of the arrhythmia (i.e. reduce stroke in patients with atrial fibrillation)
Approach to the Patient

Is the arrhythmia causing symptoms or could it?

Does the arrhythmia pose a risk to the patient? Is the arrhythmia well tolerated (type of symptoms and blood pressure during the arrhythmia)?

Which arrhythmia is present?

Does the arrhythmia require urgent cardioversion?

Does the patient require urgent hospitalization?

Is specialist consultation required, and if so, how urgently?

Should anticoagulation and/or other medical therapy be started?
Diagnosis

History and Physical

Outpatient monitory systems for presumed arrhythmia

- Traditional Holter-continuous recording of 24 or 48 hours.
- Event recorder-patient activated recorder
  - looping or non-looping.
- Mobile continuous outpatient cardiac telemetry
- Implantable loop recorder
Symptoms

The presence and type of symptoms may determine whether any action needs to be taken.

- Palpitations
- Neck discomfort
- Dizziness
- Dyspnea
- Lightheadedness
- Weakness
- Syncope
- Anxiety
- Chest discomfort
Symptoms

- Unusual
  - Tinnitus
  - Visual changes
  - Urinary frequency
  - Abdominal discomfort
  - Peripheral edema
  - Changes in vagal or sympathetic tone
  - Hormonal changes
Common Arrhythmias

- Atrial premature beats
- Ventricular premature beats
- Bradycardia
- Ventricular tachycardia
- Atrial fibrillation and atrial flutter
- Supraventricular tachycardia
- Atrioventricular block
- Nonsustained ventricular tachycardia
- Follow up of already treated VT or VF
Therapeutic Considerations

- Goal is to improve symptoms
- Prevent potentially serious outcomes
- Prevent sudden death
- Initiation of antiarrhythmic drug therapy
- Pacemakers, implantable cardioverter-defibrillators (ICDs), and biventricular devices
Referral to a Specialist

- Any patient with an arrhythmia when the primary care physician is uncomfortable with either diagnosis or management.
- Candidates for permanent pacing.
- An uncertain diagnosis, prognosis, or management strategy.
- Possible need for an implantable cardioverter defibrillator or biventricular pacemaker.
- Possible need of catheter ablation procedure.
- Antiarrhythmic drug therapy.
Routine referral consideration

- Young (<50)
- Paroxysmal AF
- Treatment options
- Failure of drug therapy
- Valve disease or decreased systolic function on echocardiogram
- Wolff-Parkinson-White or prolonged AT intervals
Urgent admission or referral

- Syncope of near syncope in patients with high degree AV block or bradycardia
- Wide complex sustained rhythms
- The diagnosis is uncertain after examination and ECG, however there is a concern about a life-threatening arrhythmia
- Sustained supraventricular tachycardia (SVT)
- Atrial fibrillation or flutter with rapid or slow rates
Urgent admission or referral

- Rapid rate (150bpm) and/or low BP (90mmHg)
- Loss of consciousness, severe dizziness, angina, increasing breathlessness
- Complications: stroke, TIA, acute or worsening heart failure
- History of coronary artery disease, cardiomyopathy, or heart failure and syncope, near syncope, and/or documented ventricular arrhythmia
Cardioversion

Direct current cardioversion

- Anticoagulation
- Recent –onset
- No structural heart disease
- Treatment of reversible cause
  - Thyrotoxicosis, ETOH
- Infection
- Young Age
Initiation of Therapy

Antiarrhythmic drugs may be best initiated in the hospital, primarily to monitor for early proarrhythmia.

The decision to hospitalize depends upon several factors:

- The presence and severity of structural heart disease.
- The indication for treatment (e.g., etiology of the arrhythmia and type and severity of associated symptoms). Treatment for ventricular tachycardia is usually started in the hospital.
Rate vs Rhythm

Rate

- Chronic, controlled atrial fibrillation
- Over 65 years of age without symptoms
- History of Coronary disease
- Contraindications for cardioversion
- Contraindications for anti-arrhythmic drugs
Rate vs Rhythm

- **Rate**
  - As effective as rhythm in the elderly
  - Target rate control at rest of 80 bpm, moderate exercise 90-120
  - First line therapy
    - Beta-blocker
    - Calcium-channel blocker
  - Digoxin
    - Sedentary, added as secondary or combination therapy
Rate vs Rhythm

- Rhythm
  - Paroxysmal
  - Symptomatic
  - Younger than 65 years of age
  - Changes in condition
    - CHF
    - Respiratory failure
    - Poor exercise tolerance
Theoretical Benefit of Rhythm Control

- Improved hemodynamics
- Relief of symptoms
- Improved exercise tolerance
- Reduced risk of stroke
- Avoidance of anticoagulants
- Decrease Mortality and Morbidity
Rhythm Control

- **Class I**: block sodium channels
  - Ia (quinidine, procainamide, disopyramide) \( \uparrow \) AP
  - Ib (lignocaine) \( \downarrow \) AP
  - Ic (flecainide) \( \leftrightarrow \) AP

- **Class II**: \( \beta \)-adrenoceptor antagonists (propranolol, sotalol)

- **Class III**: prolong action potential and prolong refractory period (suppress re-entrant rhythms) (amiodarone, sotalol)

- **Class IV**: Calcium channel antagonists. Impair impulse propagation in nodal and damaged areas (verapamil, diltiazem)

How about others: adenosine, digoxin?
Antiarrhythmic: Actions

Antiarrhythmic drugs are classified according to their effects on the action potential of cardiac cells and their presumed mechanism of action.

- **Class I**: Have a membrane-stabilizing or anesthetic effect on the cells of the myocardium.
  - **Class IA**: Depress phase 0; prolong the action potential.
  - **Class IB**: Slightly depress phase 0; shorten the action potential duration.
Antiarrhythmic: Actions (cont’d)

- **Class IC**: Marked depression of phase 0; slight effect repolarization; profound slowing of conduction

- **Class II**: Depression of depolarization phase 4; blocking beta-adrenergic receptors of the heart and kidney

- **Class III**: Prolongation of repolarization (phase 3)

- **Class IV**: Depressing depolarization (phase 4); lightening phase 1 and 2 of repolarization
Sodium Channel blocker Ia

Quinidine
Procainamide
Disopyramide

- Ventricular arrhythmias
- Prevention of paroxysmal recurrent atrial fibrillation (triggered by vagal overactivity)
- Procainamide in Wolff-Parkinson-White syndrome
Sodium Channel blocker lb

- Phenytoin
- Lidocaine
- Mexiletine

- Do not affect QRS complex
- Used for Ventricular tachycardia
Sodium channel blocker Ic

- **Flecainide**
- **Encainide**
- **Propafenone**

  - Treats current tachyarrhythmias of abnormal conduction system.
  - Contraindicated immediately post-myocardial infarction.
Beta Blockers

- Propranolol
- Esmolol
- Timolol
- Metoprolol
- Atenolol
- Bisoprolol

Beta blocking decreases myocardial infarction mortality and prevents recurrence of tachyarrhythmias.
Potassium Channel blocker

- **Sotalol**
- **Amiodarone**
- **Ibutilide**
- **Dofetilide**
- **Dronedarone**

- **Sotalol is also a beta blocker**[2]
- **Amiodarone has Class I, II, III & IV activity**
- **Sotalol: Ventricular tachycardias and atrial fibrillation**
- **(Ibutilide:) Atrial flutter and atrial fibrillation**
Calcium Channel blockers

- **Verapamil**
- **Diltiazem**

- **Ca$^{2+}$ channel blocker**
- prevent recurrence of paroxysmal supraventricular tachycardia
- reduce ventricular rate in patients with atrial fibrillation
Other Drugs

- **Adenosine**
  - Used in supraventricular arrhythmias

- **Digoxin**
  - Heart Failure with Atrial Fibrillation,
    contraindicated in ventricular arrhythmias

- **Magnesium Sulfate**
  - Used in Torsades de Pointes

- **ACE Inhibitors**

- **Ranolazine (ranexa)**
Arrhythmia risk: QTc

- Lexapro
- Celexa
- Other ssri
- Amitriptyline
- Fluoroquinolones
- Macroides
Antiarrhythmic: Uses and Adverse Reactions

- Premature ventricular contractions;
- Ventricular tachycardia;
- Paroxysmal atrial tachycardia;
- Atrial fibrillation or flutter;
- Tachycardia when rapid but short-term control of ventricular rate is desirable.

- CNS reactions: Light-headedness; weakness; somnolence.

- Cardiovascular reactions: Hypotension; arrhythmias; bradycardia.

- Other: Urinary retention; local inflammation.
Antiarrhythmic: Precautions

- renal or hepatic disease
- electrolyte disturbances
- CHF (quinidine, flecainide, procainamide and disopyramide),
- Disopyramide is used cautiously in patients with myasthenia gravis, urinary retention, glaucoma, and in men with prostate enlargement
Antiarrhythmic: Contraindications

- Hypersensitivity to the drug
- During pregnancy and lactation
- Patients with second- or third-degree AV block (if the patient has no artificial pacemaker)
- Severe congestive heart failure (CHF)
- Hypotension
- Cardiogenic shock
Ablation

Different techniques
- Surgical, RFA, Cryo

Improved efficacy over medications

ACC, HRS, AHA Guidelines suggest second line therapy behind one antiarrhythmic medications

Ongoing medical vs ablation trial
- CABANA
  - Catheter ablation vs antiarrhythmic drug therapy for atrial fibrillation trial
Outcomes and efficacy

Efficacy

Ablation
- 66-89%

Antiarrhythmic or rate control
- 9-40%

Overall recurrence is 30%
Role of the PCP in Long Term Care

- All patients should be queried at each routine visit
  - Changes in symptoms relevant to the arrhythmia
  - Treatment.

- Patients with Cardiac devices should be followed by a cardiologist
  - pacemakers,
  - implantable cardioverter defibrillators,
  - cardiac resynchronization therapy

- Patients prescribed antiarrhythmic drug therapy are generally followed by a cardiologist and/or cardiac electrophysiologist.