What is Atrial Fibrillation?

- Chaotic electrical activity in the upper chambers (atria) of the heart
- The erratic signals reaching the AV node result in the irregular rhythm characteristic of atrial fibrillation
What Causes Atrial Fibrillation?

- High Blood Pressure
- Abnormal Heart Valves
- Congenital Heart Defects
- Overactive Thyroid
  - Medications, caffeine, tobacco or alcohol
- Exposure to stimulants
- Sick sinus syndrome
- Emphysema or other lung disease
- Previous heart surgery
- Viral infections
- Physiologic Stress (surgery or illness)
- Sleep Apnea
Some people who have atrial fibrillation don't have any heart defects or damage, a condition called lone atrial fibrillation.

- In lone atrial fibrillation, the cause is often unclear, and serious complications are rare.

In at least 10% of cases, no underlying heart problem is found.
In the US at present there are about 5 million people with atrial fibrillation

Atrial fibrillation results in
- 5 fold increase in the risk of stroke
- 3 fold increase in the risk of heart failure
- 2 fold increase in the risk of death

Risk of atrial fibrillation increase with age, 8% of people over 80 have AF
Why is AF a Problem?

- Loss of normal control of heart rate
- Most often atrial fibrillation presents with a very fast heart rate
- Can lead to heart failure
Why is AF a Problem?

- People with AF usually have a significantly increased risk of stroke
  - up to 7 times that of the general population
- Stroke risk increases during AF because blood may pool and form clots in the poorly contracting atria and especially in the left atrial appendage (LAA).
How to Manage AF

- The question of rhythm control versus rate control
- Rhythm control is accomplished by medications, electricity and/or surgery
- Rate control is achieved through medications or a procedure
- Clot prevention
Cardioversion

External Defibrillator: Cardioversion

Metal paddle

EKG lead
Cardioversion
Cardioversion

- Conversion of rhythm to normal
- Electrical shock
- Medications that alter conduction through the cardiac cells
The AFFIRM study also showed no difference in risk of stroke in patients who have converted to a normal rhythm with anti-arrhythmic treatment, compared to those who have only rate control. Must be individualized to patient and cause.
Rate Control

- Medications
  - Interfere with conduction through the AV node
  - Beta blockers
    - Metoprolol, atenolol
  - Calcium channel blockers
    - Verapamil, diltiazem
  - Digoxin
Anticoagulation

- Clot prevention
- Aspirin
  - Lower risk
- Coumadin or warfarin
  - INR 2 to 3
- Newer agents
Pradaxa (Dabigatran)

- Pradaxa is in a class of medications known as a direct thrombin inhibitor
- Not a candidate for Pradaxa if
  - you are 75 years of age or older
  - History of kidney problems
Xarelto (Rivaroxaban)

- Direct factor Xa inhibitor
- Taken once a day with evening meal
- Dose reduced based on kidney function
Eliquis (Apixaban)

- Direct factor Xa inhibitor
- Taken twice a day
- Dose reduction if 2 of 3 are true:
  - Age more than 80
  - Weight less than 60 kg
  - Creatinine more than 1.5
Savaysa (Edoxaban)

- Direct factor Xa inhibitor
- Taken once a day
- Dose adjusted for kidney function
<table>
<thead>
<tr>
<th>Condition</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHF</td>
<td>1</td>
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<tr>
<td>Hypertension</td>
<td>1</td>
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<tr>
<td>Age &gt; 75</td>
<td>1</td>
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<tr>
<td>Diabetes</td>
<td>1</td>
</tr>
<tr>
<td>Prior Stroke or TIA</td>
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</table>
# Annual Stroke Risk

<table>
<thead>
<tr>
<th>CHADS2 Score</th>
<th>Stroke Risk %</th>
<th>95% CI</th>
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<tbody>
<tr>
<td>0</td>
<td>1.9</td>
<td>1.2–3.0</td>
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<tr>
<td>1</td>
<td>2.8</td>
<td>2.0–3.8</td>
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<td>2</td>
<td>4.0</td>
<td>3.1–5.1</td>
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<tr>
<td>3</td>
<td>5.9</td>
<td>4.6–7.3</td>
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<tr>
<td>4</td>
<td>8.5</td>
<td>6.3–11.1</td>
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<tr>
<td>5</td>
<td>12.5</td>
<td>8.2–17.5</td>
</tr>
<tr>
<td>6</td>
<td>18.2</td>
<td>10.5–27.4</td>
</tr>
</tbody>
</table>
Medications typically alter the electrical currents in the cardiac cells

Trying to prevent the rapid conduction needed for atrial fibrillation to occur

Anti-arrhythmics can become Pro-arrhythmics
There are several types of rhythm control medications, including:

- procainamide (Pronestyl)
- disopyramide (Norpace)
- flecainide acetate (Tambocor)
- propafenone (Rythmol)
- sotalol (Betapace)
- dofetilide (Tikosyn)
- amiodarone (Cordarone)
Maze Procedure
Maze Procedure
Success Rate

- Present Modified Maze procedure
  - Greater than 90% success rate after 5 years
  - Studies varied depending on procedure type with results of 88 to 91% after 12 months
Catheter Ablation Success Rates

- Define success
  - With or without continued medication
- Type of atrial fibrillation Paroxysmal vs. persistent
- Initial multicenter data (2005)
  - 1995 – 2002
  - 52%
  - 70% without drugs and symptom free
Catheter ablation

- Now a standard definition of success
  - Freedom from atrial fibrillation, atrial flutter and atrial tachycardia
  - No antiarrhythmic drugs
  - Followed for 12 months
  - Holter monitoring
- Blanking period of 3 months
- Voluntary use
- 80 to 85% success rates are quoted