Continuing Education
Material:

ATRIAL FIBRILLATION (A fib)

ABP, LLC

ATRIAL FIBRILLATION (A FIB)

OBJECTIVES

1. **Describe normal cardiac conduction.**
2. **Describe cardiac conduction during A Fib.**
3. **Discuss causes and diagnosis of A Fib.**
4. **Describe the treatment of A Fib.**

TABLE OF CONTENTS

This continuing education material, Atrial Fibrillation, will earn the participant 1.5 contact hours. If you have any questions regarding this information or would like further information on other continuing education opportunities, please contact:

ABP LLC
P.O. Box 127
Granger, IN. 46530

Phone: (574) 333-3908
Fax: (574) 333-2743

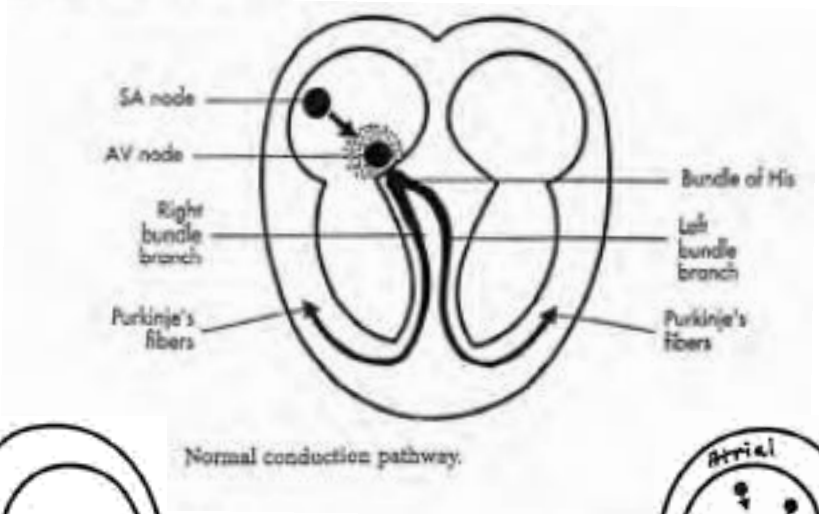
ATRIAL FIBRILLATION (A Fib)

BACKGROUND

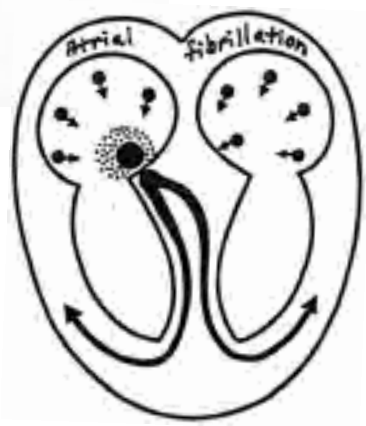
Atrial fibrillation is the most common cardiac dysrhythmia seen today. It is estimated that almost 2.2 million Americans have A Fib. The risk of developing A Fib increases as we get older. About 5-8% of people older than 80 years have atrial fibrillation. It is associated with more hospital admission than any other dysrhythmia. The mortality rate for patients with AF is about twice that of people with normal sinus rhythm. A Fib is often asymptomatic and is generally not life threatening but may result in palpitations, fainting, chest pain, or CHF. People with A Fib have up to 7 times increased risk of stroke. The level of risk depends on the number of additional risk factors.

NORMAL CARDIAC CONDUCTION

In normal conduction, the SA node initiates electrical impulses at a rate of 60 to 100 beats/min. The electrical impulse leaves the SA node and is conducted through the left atria by way of Bachmann's bundle and through the right atria by way of the intermodal pathways which results in synchronized atrial depolarization which results in atrial contraction. The electrical activity is recorded on the ECG as a P wave. The electrical impulse is then conducted through the AV node. The AV node functions to slow conduction and to let the atria contract and empty their contents into the ventricles. The AV junction serves as a backup pacemaker with a pacing rate of 40 to 60 beats/min. if the SA node fails or its impulses are blocked or in the SA node rate is less than the AV node rate. The AV junction also blocks impulses to the ventricles when the atrial rate is rapid to protect the ventricles from any dangerously fast rates. After the AV node, the electrical impulse moves rapidly through the bundle of HIS, right and left bundle branches and the Purkinje fibers which is recorded on the ECG as the QRS complex which represents ventricular depolarization resulting in ventricular contraction.



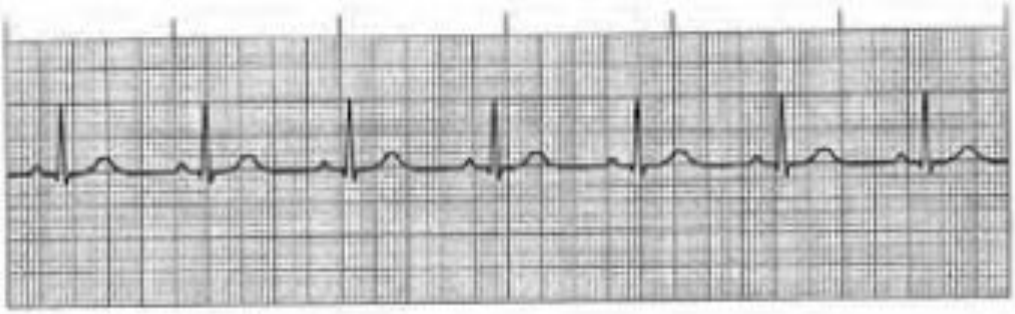
Normal conduction pathway.



ATRIAL FIBRILLATION

In A Fib multiple impulses travel through the atria at the same time. Multiple pacemakers outside the SA node in the atria take over cardiac conduction. These pacemakers are responsible for firing impulses at the rate of 400 to 600 beats/min. These impulses spread through the atria competing for a chance to get through the AV node. The rapid firing causes the atria to quiver instead of contracting in a synchronized manner. Atrial activity is irregular, chaotic and very rapid. On the ECG you will see irregular wavy deflections replacing the P wave. It is not possible to count the atrial rate. A healthy AV node is able to limit the number of impulses that get through to the ventricle. The ventricular rhythm will be irregular with a normal rate or the rate can be up to 180 beats/min.

Normal Sinus Rhythm (NSR)



Rate: Normal (60–100 bpm)
Rhythm: Regular
P Waves: Normal (upright and uniform)
PR Interval: Normal (0.12–0.20 sec)
QRS: Normal (0.06–0.10 sec)

- **Clinical Tip:** A normal ECG does not exclude heart disease.
- **Clinical Tip:** This rhythm is generated by the sinus node and its rate is within normal limits (60–60 bpm).

Atrial Fibrillation (A-fib)

- Rapid, erratic electrical discharge comes from multiple atrial ectopic foci.
- No organized atrial depolarization is detectable.

Rate: Atrial: ≥350 bpm; ventricular: variable
Rhythm: Irregular
P Waves: No true P waves; chaotic atrial activity
PR Interval: None
QRS: Normal (0.06–0.10 sec)

- **Clinical Tip:** A-fib is usually a chronic arrhythmia associated with underlying heart disease.
- **Clinical Tip:** Signs and symptoms depend on ventricular response rate.

CLASSIFICATION OF ATRIAL FIBRILLATION

These categories are based on episode timing and termination.

- **First detected**: All patients begin in this category and may or may not have had a previous undetected episode.
- **Intermittent or Paroxysmal**: Patients in this category can have episodes that last up to 7 days but normally will self-terminate within 24 hours. If a "first detected" episode self-terminates in less than 7 days and then another episode begins later on, it becomes "paroxysmal."
- **Persistent**: A Fib occurs in episode that lasts more than 7 days. Medical treatment such as cardioversion is required to end the episode.
- **Permanent**: The heart is always in atrial fibrillation. Conversion back to normal sinus rhythm is not possible or is deemed not appropriate for medical reasons.

Episodes of A Fib that last less than 30 seconds are not classified. This system also does not apply where the A Fib is a secondary condition that occurs as a result of some primary condition.

AFIB CATEGORIES BASED ON PATIENT CHARACTERISTICS

- **Lone Atrial Fibrillation:** The patient has no clinical or ECHO findings of any other heart disease, related pulmonary disease or cardiac abnormality and is under age 60.
- **Nonvalvular AF:** The patient has the absence of rheumatic mitral valve disease, a prosthetic heart valve, or mitral valve repair.
- **Secondary AF:** The patient already has a primary condition such as acute MI, cardiac surgery, pericarditis, myocarditis, hyperthyroidism, pulmonary embolism, pneumonia or some other acute pulmonary disease.

CAUSES OF ATRIAL FIBRILLATION

Some of the causes that do not involve the heart include: hyperthyroidism, excessive alcohol use (holiday heart syndrome), pulmonary embolism, pneumonia, or surgery. Treating the underlying cause often resolves the A Fib. Atrial fibrillation that occurs as a result of some other cardiac condition include: heart valve disease (congenital or can be caused by infection or degeneration), enlargement of the left ventricular wall, coronary artery disease due to atherosclerosis (blockages caused by fatty deposits that cause blockages), cardiomyopathy leading to CHF, mitral stenosis due to rheumatic heart disease or mitral valve prolapsed, dual-chamber pacemakers in the presence of normal AV conduction, carbon monoxide poisoning, sick sinus syndrome or pericarditis (inflammation of the heart wall). A family history of A Fib increases the risk by about 30%.

RECGONIZING AND DIAGNOSING ATRIAL FIBRILLATION

Patients may be symptomatic or asymptomatic. The most common signs and symptoms of A Fib include shortness of breath, chest pain, fainting, weakness, fatigue, very rapid heartbeat or palpitations and a very rapid pulse. Sometimes A Fib will be identified only with the onset of a stroke or TIA (transient ischemic attack) but often it is discovered during a routine physical or a routine ECG and the patient has been asymptomatic.

- **12 Lead ECG:** This is the primary test used to recognize the irregular rhythm of A Fib.
- **Ambulatory ECG/Halter Monitor:** This is used to catch intermittent episodes of A Fib. The patient wears a patient-activated event recorder for 1 to 4 weeks and presses a

button to start the recording after sensing the irregular heartbeat symptoms.

- **Electrophysiology (EP) Studies:** An attempt is made to induce the patient's A Fib in order to treat it.
- **Lab Tests:** There is no lab test to diagnose or confirm A Fib. Tests are done to check for an underlying cause and to rule out any heart damage. Tests include: CBC, cardiac markers, thyroid markers, electrolytes, PT, digoxin, hepatic and renal function tests and BNP.
- **Chest X-ray:** This is used to check for cardiac enlargement and pulmonary pathology and to evaluate pulmonary vasculature. If an underlying pneumonia is suspected, treatment of the pneumonia may cause the A Fib to self-terminate.
- **Transthoracic Echocardiography (TTE):** This is an ultrasound test that uses sound waves to make a picture of the inside of the heart while it is beating. It is used to help identify valvular heart disease (which may increase the risk of stroke), left and right atrial size (which could indicate that A Fib could become permanent), left ventricular size and function, peak right ventricular pressure (which could indicate pulmonary hypertension), presence of left atrial thrombus (which could indicate low sensitivity), presence of left ventricular hypertrophy and pericardial disease.
- **Transesophageal Echocardiography (TEE):** If a thrombus (blood clot) is suspected, a TEE is preferred because it has a much better visualization of the left atrium where a thrombus is formed in more than 90% of non-valvular A Fib. TEE can also detect sluggish blood flow which could also indicate the presence of a thrombus. If no thrombus is seen, the incidence of a stroke is very low.
- **Exercise Stress Testing:** This test will evaluate the patient's heart rate response to exertion and determine if the AV node blocking agents are contributing to the A Fib.

TREATMENT OF ATRIAL FIBRILLATION

There are three goals in A Fib treatment: to slow down the heart rate, to restore and maintain normal heart rhythm and to prevent stroke.

1 – Control Rate

IV or oral medication can be used to slow down the heart rate.

2—Restore Normal Sinus Rhythm

The frequency with which A Fib returns and the symptoms it cause partly determine whether or not anti-arrhythmia medication is needed.

3 – Prevent Stroke

Coexisting medical conditions such as hypertension, CHF, heart valve abnormalities or CHD increase the risk of stroke especially in those over age 65 years. Most patients take Coumadin, a blood thinner, to lower the risk of a blood clot. Sometimes aspirin is used for those who cannot take Coumadin. The method used depends on: cost, risk of stroke, risk of falls, compliance and the speed of desired onset of anticoagulation.

- **Electrical Cardioversion:** This technique uses an external defibrillator to "shock" the heart back into a normal sinus rhythm. Cardioversion works best if the A Fib is newly diagnosed. It is successful in 90% of patients. For many patients this is only a temporary solution because the atrial fibrillation often comes back. Cardioversion increases the risk of stroke and requires pretreatment with an anticoagulant medication.
- **Chemical Cardioversion:** This technique is usually tried before an electrical Cardioversion. Drugs such as amiodarone, dronedarone, procainamide, ibutilide, propafenone or flecainide are used in attempt to return the patient to a normal sinus rhythm.
- **Catheter (radiofrequency) ablation:** This technique electrically burns or destroys some of the abnormal conduction pathways in the atria. This procedure is used for patients that have tried antiarrhythmic medication without success or who cannot take the medications. This procedure has a 60-70% success rate and can have serious

complications.

- **Pacemaker:** This is used to override your own A Fib with a new electrical pacemaker. This technique is only used in a small number of patients.
- **Medications:** The choice of meds depends on the type of A Fib. Rate control tries to reduce the heart rate to one that is close to normal (60-100 bpm), without trying to convert to a regular rhythm. Rhythm control tries to restore the regular rhythm with cardioversion and then maintain it with drugs. Rhythm control is the main concern with newly diagnosed A Fib, while rate control with anticoagulation is more important in the chronic phase of A Fib.
    - **Antiarrhythmia medications** control the heart rhythm rather than the rate. They reduce the frequency and duration of atrial fibrillation episodes.
    - **Beta-blockers** slow the heart rate by decreasing the rate of the SA node and by slowing conduction through the AV node.
    - **Calcium channel blockers:** These drugs work similar to beta-blockers.
    - **Digoxin:** This drug decreases the conductivity of electrical impulses through the AV node, but onset of action is slower than with the beta-blockers or calcium channel blockers.
    - **Dofetilide:** This is an oral antiarrhythmic drug that must be given over a three day period in the hospital and carefully monitored.

PREVENTION OF ATRIAL FIBRILLATION

You can reduce your risk of developing atrial fibrillation by not smoking, maintaining a healthy weight, make low fat foods the basis of your diet, exercise at least 30 minutes every day, control high blood pressure, use alcohol and caffeine in moderation or not at all and avoid all other stimulants.

REFERENCES

1. Hussar, Robert J., BASIC DYSRHYTHMIAS, Third Ed., Mosby 2002; pp. 122-130.
2. Mcdonough, RN, EdD, Marjorle, “Managing atrial fibrillation,” NURSING 2009/NOVEMBER.
3. WebMD, LLC., “Atrial Fibrillation;” *emedicinehealth*
4. Wikipedia.org: “Atrial Fibrillation”

Atrial Fibrillation (A Fib) – Self-Assessment Quiz

Please place all answers on the Continuing Education Registration Form. Mail form to ABP LLC to be graded so that you can get your P.A.C.E certificate.

1. Which of the following statements about A Fib is correct?
   a. It is estimated that about 22 million Americans have A Fib.
   b. A Fib is a life threatening dysrhythmia.
   c. A Fib patients have a decreased risk of stroke.
   d. Patients with A Fib have a higher mortality rate than those with a normal sinus rhythm.

2. What is the normal rate of impulses that are initiated by the SA node during normal conduction?

   a. 60-100 bpm b 40-60 bpm c. 100-180 bpm d. 20-40 bpm

3. Which of the following statements is correct?
   a. The SA node is responsible for initiating all the electrical impulses that travel through the atria.
   b. Atrial fibrillation results in a very irregular and chaotic rhythm.
   c. The electrical activity traveling through the atria in A Fib is recorded as a single P wave.
   d. The ventricular rhythm will be regular.

4. Patients with this classification of A Fib have an episode that lasts 9 days and will require medical treatment.
   a. First Detected c. Persistent
   b. Paroxysmal d. Permanent

5. Which of the following is NOT a cause of A Fib?
   a. pneumonia c. cardiomyopathy
   b. carbon monoxide poisoning d. hypothyroidism

6. Which lab test is used to confirm the diagnosis of A Fib?
   a. electrolytes b. protime c. digoxin d. there is no test

7. If a thrombus is the suspected cause of A Fib, the preferred test to run is:
   a. TTE b. TEE c. ECG d. Halter Monitor

8. Which of the following is NOT a goal in treating A Fib?
   a. To restore the heart rate to 60-100 bpm.
   b. To control hypertension.
   c. To maintain a regular heart rhythm.
   d. To prevent stroke.

9. Which treatment of A Fib has a 90% success rate?
   a. electrical cardioversion c. catheter ablation
   b. chemical cardioversion d. ventricular pacemaker

10. Which medication is used to decrease the conductivity of electrical impulses through the AV node?
    a. coumadin b. digoxin c. flecainide d. beta blocker