AU InforMed

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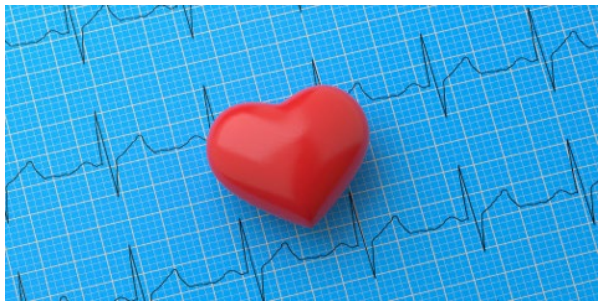
Key Inforbits

- What is Atrial Fibrillation?
- Celebrities with Atrial Fibrillation
- National Atrial Fibrillation Awareness Month
- Risk Factors Associated with Atrial Fibrillation
- Managing Atrial Fibrillation

What is Atrial Fibrillation?

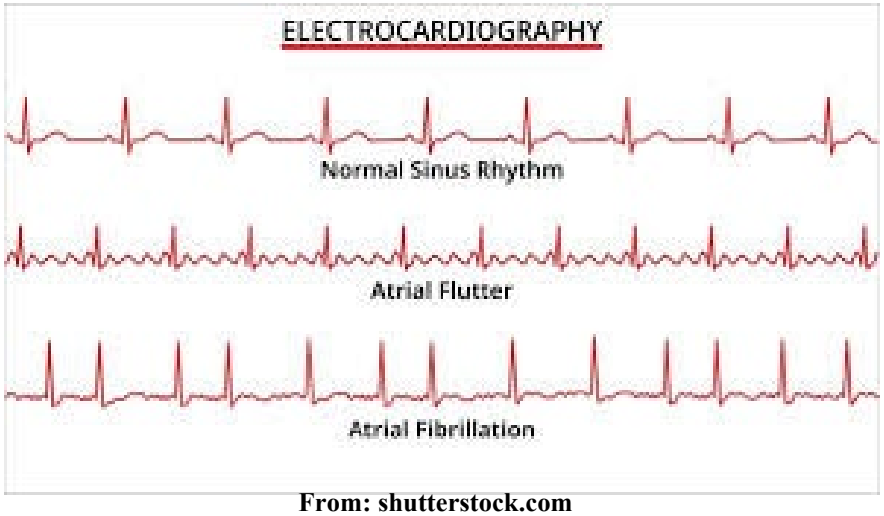
History: While there is no date correlated to the first use of the term "atrial fibrillation" (AF), the study of the characteristics of this disease can be traced back as far as 2000 BC by the Yellow Emperor of China in his book "Classics of Internal Medicine."[1] The terms used to describe AF have changed significantly over the years, including 'ataxia of the pulse,' delirium cordis,' and 'pulsus irregularis perpetuus.'[2] Since then, some major contributors to the understanding of AF include James Mackenzie, Willem Einthoven, Arthur Cushny, and Thomas Lewis.[2] There are still many questions left to be answered, but understanding of AF has increased significantly in the last 20 years due to increased technological resources and access.[1]

Pathology: AF is a type of supraventricular tachyarrhythmia with uncoordinated atrial activation and ineffective atrial contraction.[3] Understanding of the pathophysiology behind AF is still limited, but there are some general consensuses that help to narrow down the cause. One common theory for the cause of AF is signal reentry.[4] In a normally functioning cardiac cell in the atrioventricular (AV) node, a signal travels through each cardiac cell to reach its target, and there is a period of time where those cells cannot be reactivated called the "refractory period."[5] During this time, the cardiac cell works to return the cell to its resting state. In AF, there are multiple different pathologies that could confront cardiac cells to disrupt this resting state, such as slowed conduction velocity, shortened repolarization, or unidirectional blocks.[5] These pathologies block the signal from reaching its target, and instead returns the signal to its origin. The return of the signal to its origin, termed reentry, causes rapid, uncoordinated, and irregular heart rhythm.[3] There are other causes of this irregular rhythm, such as structural abnormalities, myocardial ischemia, and other concomitant diseases.[4]



Epidemiology: Risk estimates for developing AF in 2014 were 1 in 3 white individuals and 1 in 5 black individuals.[6] There are an estimated 2.3 million adults that have AF as of 2001, resulting in a prevalence of 1 in 25 individuals aged 60 years or older, and 1 in 10 individuals aged 80 years and older. This number is projected to increase 2.5-fold to 5.6 million by the year 2050. This increase in diagnosis is due to multiple factors, some being the higher birth rate of the baby boomers reaching the common age of diagnosis, and the ability to diagnose patients sooner due to technology. Prevalence was increased with increasing age, male gender, and Caucasian race (specifically in ages above 60 years).[7]

Diagnosis:[3] Diagnosis is mainly determined based on visualization of an electrocardiograph. There is value to the detection of AF using new technology, like pacemakers, but guidelines recommend a diagnosis be confirmed by a health care provider's visual assessment of the electrocardiogram. The electrocardiograph typically shows either:



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1. Irregular R-R intervals when atrioventricular conduction is present
2. Absence of distinct P waves
3. Irregular atrial activity also known as fibrillatory waves

Patients are also recommended to receive a transthoracic echocardiogram and echocardiography to assess cardiac structure, right ventricular pressure, valve pressure, etc.

Types: There are five main categories of AF. They are determined based on the duration which you have been "in AF," or how long your heart has been beating irregularly, if you have come out of AF, and how you have been out of AF. These five categories include:[8]

Table 1: Categories of Atrial Fibrillation

	Paroxysmal AF	Persistent AF	Longstanding Persistent AF	Successful AF Ablation	Permanent AF
Time in AF	< 7 days	7 days – 12 months	≥ 12 months		
Resolution of AF	Spontaneous recovery	Cardioversion required		Ablation required	No resolution

Additionally, you can have valvular AF, defined as AF being caused by a valvular issue. Valvular issues are specifically defined as mitral stenosis or artificial heart valves.[9] Patients without these two types of valvular issues are termed to have non-valvular AF. However, defining AF by the type of valve is no longer recommended by guidelines, as it no longer dictates anticoagulation therapy.[3]

Symptoms:[8] Most patients with AF do not have symptoms, which is why this disease is normally not caught until later in life. The most common symptom of AF is feeling a "fluttering" or "irregular" pulse. Other symptoms include:

- Fluttering or "thumping" in the chest
- Shortness of breath and anxiety
- Faintness or confusion
- Fatigue when exercising
- Weakness
- General fatigue
- Dizziness
- Sweating

Another symptom of AF is chest pain. However, chest pain could be an indication of a more serious condition, so patients should call their primary care provider or the hospital if they experience chest pain.

Celebrities with Atrial Fibrillation:

- Kareem Abdul-Jabbar
- Ellen DeGeneres
- Howie Mandel
- George HW Bush
- Larry Bird
- Barry Manilow
- Joe Biden
- Gene Simmons
- Elton John

National Atrial Fibrillation Awareness Month

National Atrial Fibrillation Awareness Month is recognized throughout the month of September as a time to raise awareness for this common yet critical condition. The Heart Rhythm Society and other organizations have worked together to have September designated as National Atrial Fibrillation month by the United States Senate. The Heart Rhythm Society focuses their efforts every September towards educating the public about signs, symptoms, and options available for the treatment of those with AF.[10]

Risk Factors Associated with Atrial Fibrillation

There are many comorbidities and risk factors associated with atrial fibrillation that can also exacerbate its effects. For this reason, it is advantageous to be aware of what can put you at risk to understand the importance of changing modifiable risk behaviors as well as controlling comorbidities that are not modifiable.[11]

Table 2: Risk Factors of Atrial Fibrillation

Demographics	Comorbidities	Health Behaviors & Lifestyle Factors	Other
• Aging • Caucasian ethnicity • Male sex • Low socio-economic status	• Hypertension • Chronic kidney disease • Heart failure • Diabetes mellitus • Coronary artery disease • Obstructive sleep apnea • COPD • Low HDL-C/ high triglycerides	• Obesity • Smoking • Excessive alcohol intake • Endurance sports (running, skiing, cycling, swimming) • Sedentary lifestyle	• Genetics • Mental health factors • Air pollution

Managing Atrial Fibrillation

Managing AF involves risk factor and lifestyle modifications, anticoagulation, rhythm control, and rate control. According to the 2023 ACC/AHA guidelines, AF can be divided into four stages that require different treatment approaches:[12]

1. At risk for AF
2. Pre-AF (structural or electrical findings)
3. AF (paroxysmal, persistent, long-standing persistent, successful ablation)
4. Permanent AF

Lifestyle and Risk Factor Modification: Aggressive management in modifiable risk factors such as obesity, inactivity, alcohol consumption, diabetes, hypertension, sleep apnea and hyperthyroidism can prevent the onset progression and adverse outcomes of AF. [3, 12]

- Engaging in regular physical activity and following heart-healthy diet that is low in salt, saturated fats, trans fats, and cholesterol.
- Maintaining a healthy weight.
- Managing and treating high blood pressure, high cholesterol, and sleep apnea.
- Avoid smoking and excessive amounts of alcohol.

Anticoagulation: AF can increase the risk of forming blood clots in the heart, which can travel to the brain and result in a stroke. Therefore, patients with AF should receive long-term oral anticoagulation to reduce the risk of stroke and other embolic events. A useful tool in predicting stroke risk in patients with AF is calculating an individual's CHA_2DS_2-VASc score. This point-based system is calculated by adding points according to certain risk factors (Table 3). A CHA_2DS_2-VASc score of ≥2 in men and ≥3 in women indicates oral anticoagulant therapy. Oral anticoagulant therapy can reduce the risk of thromboembolic stroke in nonvalvular AF patients with a CHA_2DS_2-VASc score of ≥2 in men and ≥3 in women.[13] Direct oral anticoagulants (DOACs) are preferred over warfarin in nonvalvular AF patients unless a patient with AF has a mechanical valve or moderate to severe mitral stenosis, then warfarin is preferred. [3, 12]

- Vitamin K antagonists – Warfarin (Coumadin, Jantoven)
- Direct thrombin inhibitor – Dabigatran (Pradaxa)
- Direct factor Xa inhibitors – Apixaban (Eliquis), edoxaban (Savaysa), rivaroxaban (Xarelto)

Table 3: CHA2DS2-VASc Scoring System

Risk Factor	Score
Congestive heart failure	1
Hypertension	1
Age ≥75 years	2
Diabetes mellitus	1
Stroke/TIA/Thromboembolism	2
Vascular disease (prior MI, PAD, or aortic plaque)	1
Age 65 to 74 years	1
Sex **c**ategory (male or female)	1
TIA = transient ischemic attack Maximum score: 8 (male); 9 (female)	

Rhythm control: 2023 ACC/AHA guidelines emphasize early treatment of rhythm control. Radiofrequency catheter ablation is considered first-line therapy. Direct current (DC) cardioversion is considered for urgent conversion of unstable AF. Antiarrhythmic drugs can be considered to maintain normal sinus rhythm.[3, 12]

- Catheter ablation – Patients must receive an anticoagulant for at least three months after catheter ablation. The need for long-term anticoagulation depends on the patient's CHA_2DS_2-VASc score.
- Antiarrhythmics (PO/IV) – Amiodarone (Pacerone), dronedarone (Multaq), disopyramide IR/ER (NorpaceIR/ER), dofetilide (Tikosyn), flecainide (Tambocor), propafenone IR/ER/SR (Rythmol IR/ER/SR), sotalol (Betapace)

Rate control: Beta-blockers are preferred in patients with coronary artery disease or systolic dysfunction. In patients with asthma, verapamil or diltiazem may be preferred over beta-blockers.[3, 12]

- Beta-blockers (PO/IV) – Atenolol (Tenormin), bisoprolol (Cardicor), carvedilol (Coreg), esmolol (Brevibloc), metoprolol IR/ER (Lopressor IR/ER), nadolol (Corgard), propranolol IR/ER (Inderal IR/ER)
- Calcium channel blockers (PO/IV) – Verapamil IR/ER (Verelan IR/ER), diltiazem IR/ER (Cardizem IR/ER)
- Others – Digoxin (Lanoxin)

Emerging therapies: In March 2023, the PULSED AF pivotal trial used Pulsed Field Ablation (PFA) to irreversibly electroporate tissue and treat AF. With PFA, electrical pulses are used to cause nonthermal irreversible electroporation and induce cardiac death. Recently, the FDA approved three pulsed field ablation (PFA) systems: FARAPULSE™, CENTAURI™, and PulseSelect™. Traditional catheter ablation uses radiofrequency heat energy to destroy heart tissue to treat arrhythmias, which can come with thermally mediated complications. The results of this study showed that PFA was effective at one year in patients with paroxysmal and persistent AF as well as a low rate in the primary safety outcomes (freedom from a composite of serious procedure and device-related adverse events).[14]

Summary

It is essential to raise awareness for atrial fibrillation during the month of September due to the increase in prevalence of this condition. Living with undiagnosed AF could prevent someone from receiving what could be life-saving treatment, which can result in potential blood clots, heart failure, or strokes. It is important to be aware of what can put patients at risk since AF can be asymptomatic. Managing modifiable risk factors as well as treating underlying conditions can help improve the overall health of people living with AF.

References:

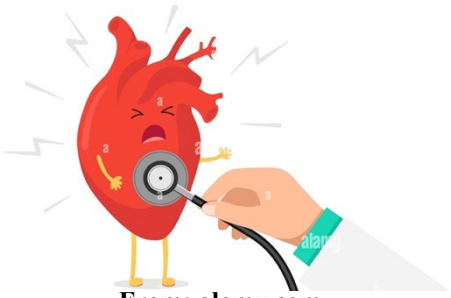
1. ACC [Internet]. Washington DC. American College of Cardiology; c1949-2024. Atrial fibrillation: a timeline of this veritable quandary. 2015 Dec 16 [cited 2024 Sep 23]; [about 5 screens]. Available from: https://www.acc.org/membership/sections-and-councils/fellows-in-training-section/section-updates/2015/12/15/16/58/atrial-fibrillation#:~:text=The%20history%20of%20AFib%2C%20however,in%20open%20chest%20animal%20models.
2. Aronson JK. One hundred years of atrial fibrillation. Br J Clin Pharmacol [Internet]. 2005 Oct [cited 2024 Sep 23];60(4):345-6. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1884824/
3. Joglar JA, Chung MK, Arbruster AL, et al. 2023 ACC/AHA/ACCP/HRS guideline for the diagnosis and management of atrial fibrillation. Circulation [Intranet]. 2023 Nov 30 [cited 2024 Sep 17];149(1):1-156. Accessible from: https://www.ahajournals.org/doi/10.1161/CIR.0000000000001193
4. Tilton JJ, Sanoski C, Bauman JL. The Arrhythmias. In: DiPiro JT, Yee GC, Haines ST, Nolin TD, Ellingrod VL, Posey LM, editors. DiPiro's Pharmacotherapy: A pathophysiologic approach.

11th ed. [AU Intranet; Access Pharmacy] New York: McGraw-Hill Medical; 2020 [cited 2024 Sep 17]. Chapter 39. Available from: https://accesspharmacy.mhmedical.com/content.aspx?bookid=2577&sectionid=233592457
5. Staerk L, Sherer JA, Ko D, et al. Atrial fibrillation: epidemiology, pathophysiology, and clinical outcomes. Circ Res [Intranet]. 2017 Apr 28 [cited 2024 Sep 17];120(9):1501-1517. Accessible from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5500874/
6. Kornej J, Borschel CS, Benjamin EJ, Schnabel RB. Epidemiology of atrial fibrillation in the 21st century. Circ Res [Intranet]. 2020 Jun 18 [cited 2024 Sep 17];127(1):4-20. Accessible from: https://www.ahajournals.org/doi/epub/10.1161/CIRCRESAHA.120.316340
7. Go AS, Hylek EM, Phillips KA, et al. Prevalence of diagnosed atrial fibrillation in adults. JAMA [Intranet]. 2001 May 9 [cited 2024 Sep 17]; 285(18):2370-2375. Accessible from: https://jamanetwork.com/journals/jama/fullarticle/193807
8. American Heart Association. What are the symptoms of atrial fibrillation [Intranet]. Dallas (TX): American Heart Association. Updated 2023 Mar 27 [cited 2024 Sep 17]. Accessible from: https://www.heart.org/en/health-topics/atrial-fibrillation/what-are-the-symptoms-of-atrial-fibrillation-afib-or-af
9. Fauchier L, Philippart R, Clementy N, et al. How to define valvular atrial fibrillation? Arch Cardiovasc Dis [Intranet]. 2015 Oct [cited 2024 Sep 17];108(10):530-539. Accessible from: https://www.sciencedirect.com/science/article/pii/S0163725817300189
10. Heart Rhythm Society. AFib awareness month 2024 [Intranet]. Washington (D.C.): Heart Rhythm Society. [cited 2024 Sep 17]. Accessible from: https://www.hrsonline.org/afib-awareness-month-2024
11. Shantsila E, Choi EK, Lane D, Joung B, Lip G YH. Atrial fibrillation: comorbidities, lifestyle, and patient factors. Lancet [Intranet]. 2024 Feb [cited 2024 Sep 17]; 37(100784). Assessible from: https://www.sciencedirect.com/science/article/pii/S266677622300203X#sec3
12. Bazil CW, Crouse EL, Dalton VK, Epstein EJ, Juurlink DN, Kim RB, et al. Treatment of atrial fibrillation. Med Lett Drugs Ther. 2024 Jan 8 [cited on 2014 Sept 8];66(1693):1-12.
13. Verma A, Haines DE, Boersma LV, Sood N, Natale A, Marchlinski FE, Calkins H, et al. Pulsed field ablation for the treatment of atrial fibrillation: PULSED AF pivotal trial. Circulation [Internet]. 2023 May 9;147(19):1422-1432. Accessible from: https://doi.org/10.1161/circulationaha.123.063988
14. Hartl S, Reinsch N, Füting A, Neven K. Pearls and pitfalls of pulsed field ablation. Korean Circ J. 2023 May;53(5):273-293. DOI: 10.4070/kcj.2023.0023.

The last "dose" …

"Why should you never lie to a cardiologist? Because they can always spot AFIB."

–Anonymous



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