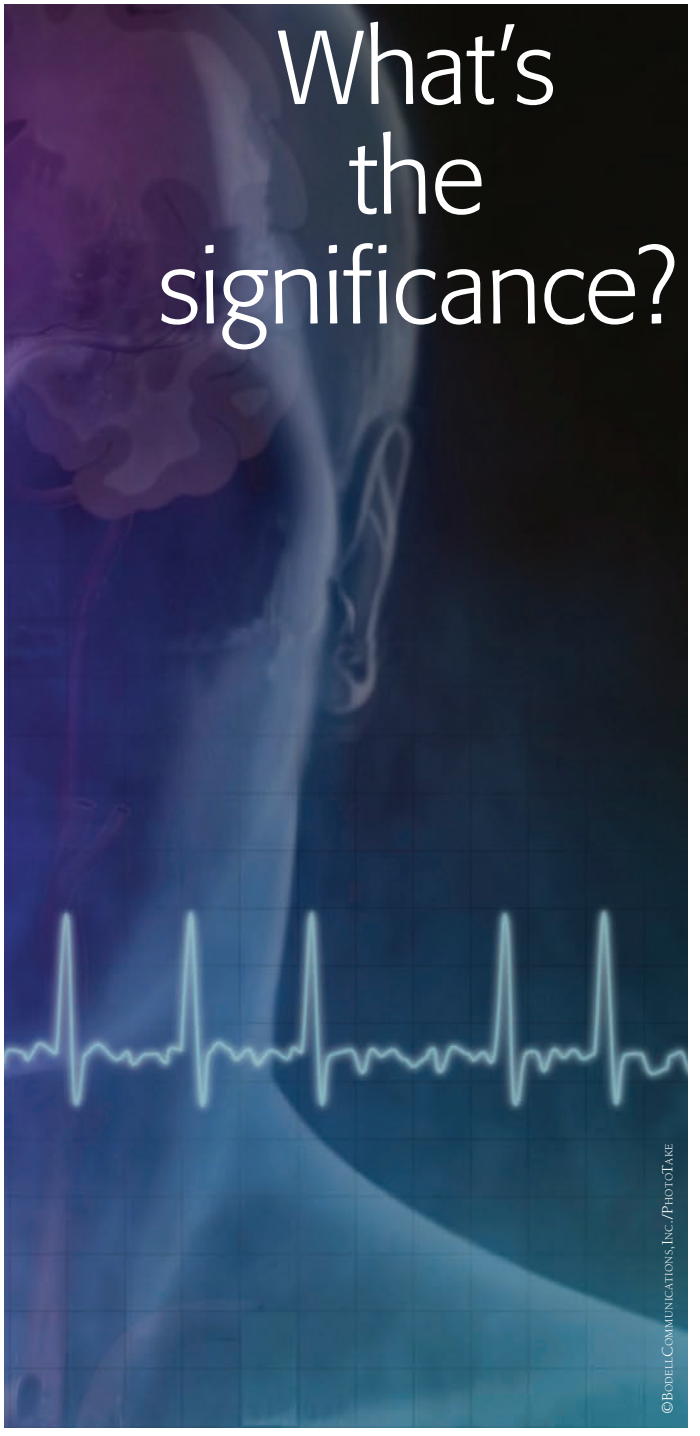
# New-onset

# atrial fibrillation:

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THE MOST COMMON DYSRHYTHMIA, atrial fibrillation (AF) affects more than 1% of the general population, with a peak prevalence of 10% in those older than 80.[1,2] In a study examining the trends of AF-related hospitalizations in the United States, overall hospitalizations increased by 23% from 2000 to 2010, particularly in people over 65.[3] By 2050, an estimated 16 million U.S. patients will have AF.[2]

Even though clinicians have an arsenal of interventions to manage this dysrhythmia, AF can result in many health issues that can have catastrophic effects on a patient's hemodynamic stability and quality of life. This article provides a basic overview of AF to help nurses in various practice settings not only to better understand AF, but also to assess patients with AF and intervene appropriately.

## The case of a racing heart

Mr. G, 68, with a history of hypertension, told his wife, "My heart feels funny all of a sudden. It feels like it's beating too fast, and I feel weak and lightheaded." His wife, a nurse, noted tachycardia with an irregularly irregular rhythm when she took his pulse. Due to the serious nature of AF, she convinced him to go to the ED immediately.

When Mr. G arrived at the local ED, his vital signs were obtained: afebrile, 160, 26, 80/50; $Spo_2$ 93% on room air. Supplemental oxygen was administered via nasal cannula at 2 L/minute. He was placed on a cardiac monitor and peripheral venous access was established. Blood specimens were obtained and sent to the lab for studies including cardiac biomarkers, electrolytes, and thyroid-stimulating hormone. A 12-lead ECG was obtained, which showed rapid AF without evidence of myocardial ischemia or infarction.

Although Mr. G denied chest discomfort, he was tachypneic and dyspneic, and he complained of being short of breath. His skin was

pale, cool, and diaphoretic. The cardiologist arrived and Mr. G was prepared for immediate synchronized electrical cardioversion.

## Pathophysiology of AF

AF is characterized by uncoordinated and irregular electrical activity in the atria.[4] Instead of the sinoatrial (SA) node acting as the heart's normal intrinsic pacemaker, multiple ectopic atrial pacemakers take over. This causes the atria to quiver instead of contracting in a synchronized way.[5] These ectopic atrial impulses are faster than SA node impulses and take multiple, chaotic, random pathways through the atria to the atrioventricular node. Because blood isn't effectively pumped from the atria, thrombus formation and subsequent embolization of atrial thrombi can occur with any form of AF. Thrombus formation is a significant risk factor for acute ischemic stroke in patients with AF, as well as embolization to other areas of the body via the pulmonic and systemic circulations.

On the ECG, AF is characterized by fibrillatory (or f) waves, which replace the normal P waves, and an irregularly irregular ventricular rhythm with variation in R wave to R wave intervals.[6] (See *Recognizing AF.*)

Risk factors for the development of AF include hypertension, myocardial infarction, heart failure, obesity, alcohol use, smoking, and obstructive sleep apnea.[4] (See *Who's at risk for AF?*)

## Clinical manifestations and classification

The initial presentation of AF can be very subtle, and some patients may be asymptomatic.[1] Complaints of intermittent palpitations or unusual fatigue may be the only clues to this dysrhythmia. Signs and symptoms such as tachycardia, weakness, shortness of breath, dizziness, decreased exercise tolerance, or mild dyspnea may also be noted. Other signs and symptoms, which can be more serious, include dyspnea at rest, angina, presyncope, or sometimes syncope. The patient with AF may experience an embolic event or right-sided heart failure with peripheral edema, weight gain, and ascites.[1]

See *Classification of AF* for information about how AF is classified.

## AF diagnosis

Guidelines for the initial diagnosis, management, and prevention of AF are well established;[4] they include obtaining a comprehensive health history and conducting a physical assessment. (See http://content.onlinejacc.org/article.aspx?articleid=1854230 for these guidelines.) Diagnostic studies include an ECG, transthoracic echocardiogram (TTE), and blood work.

An irregularly irregular heart rhythm and/or a rapid heart rate, as in this case study, require an ECG to identify and document the patient's dysrhythmia.[7] Besides identifying AF, the ECG can provide additional information such as the presence of bundle-branch block, left ventricular hypertrophy (LVH), and prior myocardial infarction (MI).

A TTE can provide information such as the presence of pericardial disease, LVH, and left atrial (LA) thrombus. It can also provide information about chamber size and function.[4]

Blood work can provide information about hepatic, renal, and thyroid function, as well as the presence of

### Who's at risk for AF?

Risk factors for AF include:

- advanced age
- hypertension
- diabetes mellitus
- coronary artery disease
- valvular heart disease
- heart failure
- obesity
- obstructive sleep apnea
- cardiothoracic surgery
- smoking
- alcohol use
- hyperthyroidism
- European ancestry
- family history
- genetic variants
- LVH
- left atrial enlargement
- increased C-reactive protein
- increased brain natriuretic protein

*Source:* January CT, Wann LS, Alpert JS, et al. 2014 AHA/ACC/HRS guideline for the management of patients with atrial fibrillation: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines and the Heart Rhythm Society. *J Am Coll Cardiol.* 2014;64(21):e1-e76. http://content.onlinejacc.org/article.aspx?articleid=1854230.

### Recognizing AF

The 6-second rhythm strip above shows rapid AF.
**Rhythm:** irregular
**Rate:** atrial—indiscernible; ventricular—130 beats/minute
**P wave:** absent; replaced by fine fibrillatory (f) waves
**PR interval:** indiscernible
**QRS complex:** 0.08 second
**T wave:** indiscernible
**QT interval:** unmeasurable.

acute coronary syndromes and electrolyte imbalances.

Depending upon the patient's signs and symptoms, additional diagnostic studies may be performed such as a chest X-ray, transesophageal echocardiogram (TEE), exercise testing, Holter or event monitoring, and invasive electrophysiology study.[4]

## AF management

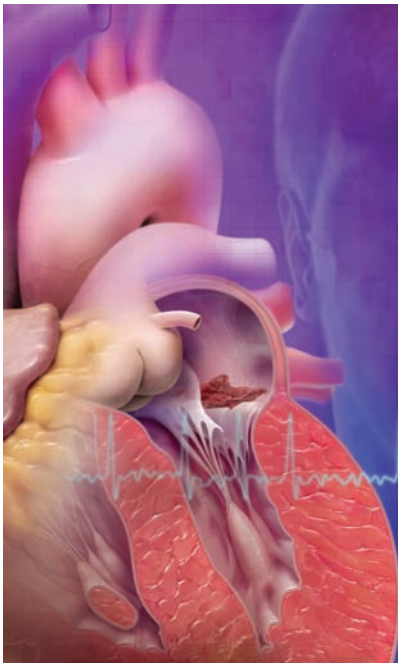
The main treatment goals for AF include resolution of hemodynamic compromise related to the dysrhythmia by controlling the heart rate and restoring normal sinus rhythm (NSR) when possible, and prevention of thrombi formation and subsequent embolism.[8]

Because of this embolic risk, chronic oral anticoagulation is recommended for most AF patients. It's important to keep in mind, however, that anticoagulation is associated with an increased risk of bleeding and the risks and benefits of therapy must be discussed with the patient.[9] (See *Selected recommendations for risk-based antithrombotic therapy.*) It's also important to remember that the risk of a thromboembolic complication (such as a stroke) in patients with AF persists even after a return to sinus rhythm.

Treatment strategies for either rate or rhythm control include both pharmacologic and nonpharmacologic options. The decision to follow a particular strategy depends on patient age, previous health history and hemodynamic stability, and AF duration.[10]

## Synchronized electrical cardioversion

Rhythm-control strategies to restore NSR include synchronized electrical (direct-current) cardioversion. Synchronized electrical cardioversion is indicated urgently for hemodynamically unstable patients like Mr. G experiencing serious signs and symptoms related to rapid ventricular rates, including acute heart failure, or worsening myocardial ischemia.[4]



AF can have catastrophic effects on a patient's hemodynamic stability.

The decision to use electrical cardioversion considers such factors as hemodynamic instability, previous pharmacologic response, duration of AF, and anticoagulation.

For patients with AF of 48 hours or longer duration, at least 3 weeks of therapeutic anticoagulation with warfarin (international normalized ratio [INR] 2.0 to 3.0) is typically required before electrical or pharmacologic cardioversion and is continued for at least 4 weeks after cardioversion.[4]

TEE performed before electrical cardioversion may identify patients with LA thrombi who are at risk for thromboembolic events with restoration of NSR. It may also be used to assess those without prior anticoagulation or for whom anticoagulation is contraindicated.[4]

## Rate control

Control of the ventricular rate may be reasonable as an initial therapy in older adults with persistent AF or in patients with mild signs and symptoms, such as palpitations and fatigue. Rate control medications include beta-blockers and calcium channel blockers. I.V. or oral amiodarone may be needed for rate control in patients with poor left ventricular function.[10]

A rate control strategy can be used for symptom management or when patients remain asymptomatic and LV function is preserved.[4]

## Classification of AF

**Paroxysmal AF** terminates spontaneously or with intervention within 7 days of onset. Episodes may recur with variable frequency.

**Persistent AF** is continuous AF that's sustained for more than 7 days.

**Long-standing persistent AF** is continuous AF of more than 12 months' duration.

**Permanent AF** means the patient and clinician have made a joint decision to stop further attempts to restore and/or maintain sinus rhythm. Acceptance of AF represents a therapeutic attitude on the part of the patient and clinician rather than an inherent pathophysiologic attribute of AF. Acceptance of AF may change as symptoms, efficacy of therapeutic interventions, and patient and clinician preferences evolve.

**Nonvalvular AF** occurs in the absence of rheumatic mitral stenosis, a mechanical or bioprosthetic heart valve, or mitral valve repair.

*Source:* January CT, Wann LS, Alpert JS, et al. 2014 AHA/ACC/HRS guideline for the management of patients with atrial fibrillation: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines and the Heart Rhythm Society. *J Am Coll Cardiol.* 2014;64(21):e1-e76. http://content.onlinejacc.org/article.aspx?articleid=1854230.

## Pharmacologic cardioversion

Rhythm control is often considered in younger patients with a shorter duration of AF and in patients who can tolerate antiarrhythmic drugs. Rhythm control attempts to restore and maintain NSR.[4] Recommendations for pharmacologic cardioversion of AF include Class I agents such as flecainide, dofetilide, propafenone, and ibutilide as long as the patient has no contraindications.[4]

## Pharmacotherapy to maintain NSR

The guidelines recommend treating any identified precipitating or reversible causes of AF before antiarrhythmic drug therapy is initiated.[4]

Amiodarone, dofetilide, dronedarone, flecainide, propafenone, and sotalol are recommended to maintain sinus rhythm for patients with AF. The antiarrhythmic drugs are selected based on patients' underlying heart disease and comorbidities.[4]

## Other treatment strategies

Additional therapies for AF include catheter ablation, which can be accomplished with either radiofrequency energy or freezing (cryoablation).[11] Indications for AF catheter ablation include those patients who remain symptomatic despite maximized medical therapy including rate and rhythm control.[7]

Other invasive procedures show some success but require careful consideration by both the healthcare provider and patient. These include a surgical Maze procedure. The Maze procedure involves surgically creating atrial incisions at critical locations to disrupt abnormal electrical impulses and prevent sustained AF.[10]

### Selected recommendations for risk-based antithrombotic therapy

- In patients with AF, antithrombotic therapy should be individualized based on shared decision making after discussion of the absolute and relative risks of stroke and bleeding and the patient's values and preferences.
- Selection of antithrombotic therapy should be based on the risk of thromboembolism irrespective of whether the AF pattern is paroxysmal, persistent, or permanent.
- In patients with nonvalvular AF, the $CHA_2DS_2$-VASc score is recommended for assessment of stroke risk.
- For patients with AF who have mechanical heart valves, warfarin is recommended, and the target INR intensity (2.0 to 3.0 or 2.5 to 3.5) should be based on the type and location of the prosthesis.
- For patients with nonvalvular AF with prior stroke or transient ischemic attack, oral anticoagulants are recommended. Options include warfarin (INR 2.0 to 3.0), dabigatran, rivaroxaban, or apixaban.
- Among patients treated with warfarin, the INR should be determined at least weekly during initiation of antithrombotic therapy and at least monthly when anticoagulation is stable (INR in target range).
- For patients with nonvalvular AF unable to maintain a therapeutic INR level with warfarin, use of a direct thrombin or factor Xa inhibitor (dabigatran, rivaroxaban, or apixaban) is recommended.
- Reevaluation of the need for and choice of antithrombotic therapy at periodic intervals is recommended to reassess stroke and bleeding risks.
- Renal function should be evaluated before initiation of direct thrombin or factor Xa inhibitors and should be reevaluated when clinically indicated and at least annually.

*Source:* Adapted from January CT, Wann LS, Alpert JS, et al. 2014 AHA/ACC/HRS guideline for the management of patients with atrial fibrillation: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines and the Heart Rhythm Society. *J Am Coll Cardiol.* 2014;64(21):e1-e76. http://content.onlinejacc.org/article.aspx?articleid=1854230.

## Nursing considerations

For those patients with new-onset or symptomatic AF, nurses are instrumental in performing a comprehensive assessment of patient risk factors and signs and symptoms. This data will help the healthcare provider develop an individualized treatment strategy. A strong understanding of the underlying pathophysiology and management of AF helps nurses assess clinical outcomes and identify potential complications of both the dysrhythmia and its therapy.[12]

Besides safely administering medication during the initiation of therapy, nurses have a primary role in educating patients about AF, its treatment, and potential complications. For example, in an international survey of both patient and physician understanding of AF, 25% of patients in the survey couldn't explain AF, and physicians said that 51% of their patients with AF had an important need for more and improved information.[13]

With current technology support, nurses can help provide educational resources for the patient and family. Postdischarge follow-up phone calls, appointment reminder calls, and prescription refill reminders can encourage patients to self-manage their disease.

Nurses in various care settings are in a unique position to modify patient education based on their knowledge of their patient's age, health literacy level, socioeconomic resources, and comorbidities. Nurses can teach and encourage patients in self-care practices such as taking their pulse and knowing potential adverse reactions to their medication, medication interactions, and signs and symptoms of bleeding and thromboembolic events. Patients also need information about when and how to contact their healthcare provider in the event of a complication or adverse reaction. Nurses should encourage patients to seek more information on their own to empower them. Education about

weight control, smoking cessation, heart-healthy diet, and regular physical activity can improve the patient's overall well-being.

## Resolution of the case study

In the case of Mr. G, synchronized electrical cardioversion restored NSR, and Mr. G's clinical status stabilized. Following cardioversion, the decision about long-term anticoagulation therapy will be based on his individual thromboembolic risk profile, and he'll continue to follow-up with a cardiologist after hospital discharge.

## Recognizing the risk

Because AF is the most common dysrhythmia, its significance isn't always appreciated.[1,13] With the increased incidence of heart disease in the aging U.S. population, the lifetime risk for the development of AF is quite high. Many patients with AF don't fully appreciate their risk.[13] All nurses should have a basic understanding of AF to ensure that they can educate patients about this serious dysrhythmia in order to optimize care delivery and patient outcomes. ■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RESOURCE

Centers for Disease Control and Prevention. Division for Heart Disease and Stroke Prevention. Atrial fibrillation fact sheet. 2015. www.cdc.gov/dhdsp/data_statistics/fact_sheets/fs_atrial_fibrillation.htm.



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