Published in final edited form as:

J Nurse Pract. 2019 January ; 15(1): 60–64. doi:10.1016/j.nurpra.2018.08.015.

Atrial Fibrillation Symptom Perception

Megan Streur, PhD, RN, FNP-C [Postdoctoral Fellow]

University of Washington School of Nursing, Department of Biobehavioral Nursing and Health Informatics, 1959 NE Pacific Street, Health Sciences Building, Box 357266, Seattle, WA 98195-7266

Abstract

Atrial fibrillation (AF), the most common cardiac arrhythmia, is associated with a significantly increased risk of ischemic stroke, heart failure, and death. AF is a heterogeneous disease both in terms of the pathophysiologic mechanisms that lead to the disease, and in terms of symptom presentation. Although most patients with AF perceive symptoms, their symptom experience is highly variable. The purpose of this paper is to review the: 1) epidemiology and pathophysiology of AF, 2) symptoms associated with AF, and 3) implications for clinical practice based on disparate symptom perception.

Keywords

atrial fibrillation; symptoms; symptom management

Introduction

Atrial fibrillation (AF), the most common cardiac arrhythmia, is defined as uncoordinated atrial activation with consequent ineffective atrial contraction.¹ Electrocardiographic (ECG) characteristics of AF are considered “irregularly irregular” and include irregular R to R intervals (if atrioventricular conduction remains intact), the absence of distinct P-waves, and irregular atrial activity.¹ AF is associated with nearly a 5-fold increased risk of stroke and heart failure and greater than 1.5-fold increased risk of mortality.^{2–4} Compared to men, women have a 12% greater risk of mortality.² In addition to reducing AF-related morbidity and mortality, a major goal of AF treatment is to reduce the symptom burden.^{1,5} Although most patients with AF perceive symptoms, the symptom experience is highly variable, with some individuals reporting no symptoms and others reporting severe symptoms that negatively impact functional status and quality of life.^{5,6} The purpose of this paper is to review the: 1) epidemiology and pathophysiology of AF, 2) symptoms associated with AF, and 3) implications for clinical practice based on disparate symptom perception.

Corresponding author, Author byline: Megan Streur, PhD, FNP-C, Phone: (971) 322-8844 mstreur@uw.edu.

Publisher's Disclaimer: This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Epidemiology and Classification of Atrial Fibrillation

AF currently affects more than 5 million individuals in the United States and the prevalence is projected to reach 12.1 million by 2030.⁷ AF is increasingly common with advancing age, affecting approximately 8% of adults over age 65 and more than 14% of adults age 85 or older.⁸ In addition to advanced age, several comorbid conditions and lifestyle factors increase the risk of developing AF including hypertension, coronary artery disease, heart failure, valvular heart disease, diabetes mellitus, obesity, hyperlipidemia, sleep apnea, hyperthyroidism, moderate to heavy alcohol consumption, and smoking.^{1,3,9}

AF is classified in terms of the duration of arrhythmia episodes and the pattern of episode termination. *Paroxysmal AF* is defined as AF that terminates within 7 days of onset, either spontaneously or with intervention. *Persistent AF* is defined as AF that is sustained for over 7 days, typically requiring medical or procedural intervention to restore sinus rhythm. *Longstanding persistent AF* is defined as continuous AF lasting for more than 12 months. *Permanent AF* is when the patient and clinician decide jointly to cease attempts to restore sinus rhythm.^{1,9} Additional classifications based on the cause of the arrhythmia include vagally-mediated AF (AF precipitated by a period of high parasympathetic tone, such as sleep), post-operative AF (typically related to major cardiac surgery), and valvular AF (AF associated with valve replacement, mitral stenosis, or mitral repair).^{1,9}

Classifying an individual's risk status for thromboembolic ischemic stroke is essential to guide selection of an appropriate antithrombotic treatment strategy in patients with AF. Clinicians often calculate the CHA2DS2-VASc¹⁰ score to quantify the risk of thromboembolism. CHA2DS2-VASc is calculated based on an individual's history of heart failure (C), hypertension (H), age ≥ 65 years (A), diabetes (D), stroke/transient ischemic attack (S), and vascular disease (VASc), with 1 point assigned per risk factor, but 2 points for history of ischemic stroke/transient ischemic attack and 2 points for age if the patient is ≥ 75 years old: the higher the score, the greater the risk of ischemic stroke.

Pathophysiology of Atrial Fibrillation

AF is the result of diverse pathophysiologic (genetic, structural, and electrophysiologic) mechanistic pathways, with AF representing a common phenotype for the multiple pathways.¹ Conditions such as hypertension, coronary artery disease, valvular abnormalities, and heart failure lead to increased left atrial pressure, atrial dilation, and atrial wall stress, resulting in structural abnormalities of the atrium such as myocardial fibrosis and/or hypertrophy. These structural changes, or other sources of atrial inflammation, increase susceptibility to AF from ectopic triggers and cause conduction abnormalities that promote re-entry. Rapidly firing ectopic AF triggers often originate in the pulmonary veins. Other mechanisms involved in AF initiation include activation of the parasympathetic and/or sympathetic autonomic nervous system, which is thought to be related to the plexi of autonomic ganglia located near the left atrial and pulmonary vein junctions. Once initiated, AF itself promotes further structural and electrical remodeling, which underlies the saying "AF begets AF."^{1,9}

Atrial Fibrillation Symptom Perception

Between 10-40% of individuals with AF are asymptomatic, termed “silent AF”.¹¹ Thus, most AF patients experience arrhythmia-related symptoms. The most common symptoms reported in association with AF include fatigue, shortness of breath, palpitations, chest pain/discomfort, and dizziness, the first two symptoms being the most common.^{1,9} AF symptoms often impact daily activities through exercise intolerance and arrhythmia-related psychological distress, thereby reducing quality of life.¹² Individuals with symptomatic AF describe the experience as unpredictable and emotionally burdensome.⁶

A variety of pathophysiologic mechanisms influence the perception of AF symptoms including the loss of atrioventricular synchrony, tachycardia, reduced cardiac output, decreased left ventricular diastolic and/or systolic function, and impaired myocardial perfusion.⁵ Mechanisms other than arrhythmia occurrence and altered hemodynamics are involved in AF symptom perception. Arrhythmia episodes may not correlate well with AF symptom reports: Many individuals experience symptoms during some, but not all, AF episodes.^{9, 13} Further, some patients report AF symptoms during sinus rhythm.¹⁴ Variations in autonomic tone (the balance of parasympathetic and sympathetic input to the cardiac autonomic ganglia) likely influence whether an individual perceives AF symptoms.^{15,16} Higher levels of anxiety and depression are associated with a greater frequency and severity of AF symptoms.¹⁷ The number and severity of AF symptoms increases in the setting of certain comorbidities, including heart failure, diabetes, obesity, and coronary artery disease.¹⁸⁻²⁰ Individuals with paroxysmal AF are more likely to experience palpitations,¹⁸ whereas individuals with persistent AF tend to have more fatigue and dyspnea.¹⁹

Several sociodemographic characteristics have also been associated with variations in the presence, type, or severity of AF symptoms. Palpitations are more common in younger individuals, whereas older adults may experience nonspecific AF symptoms (fatigue, dyspnea).^{18,20,21} Women are more likely to experience most AF symptoms, and with greater severity than men.²⁰⁻²² Specifically, women are more likely than men to experience palpitations, dyspnea, lightheadedness, fatigue, and chest discomfort.^{21,22} Caucasians tend to experience less severe symptoms than members of other racial and ethnic groups.^{23,24} An important gap in the literature relates to whether there are inherent differences in symptom mechanisms based on gender and race/ethnicity. Notably, evidence from a large cohort study and a systematic review show that women and underrepresented racial/ethnic minorities are less likely to undergo several procedures used for AF symptom management including electrical cardioversions, AF ablations, and MAZE surgeries.^{24,25} Further research exploring the reasons for gender, racial, and ethnic differences in AF clinical management are warranted.

Clinical Implications for Nurse Practitioners

Nurse practitioners (NP) can play a critical role in AF management by ensuring patients receive appropriate diagnosis and symptom management regardless of their symptom presentation. During the diagnostic process NPs should be aware that AF symptoms are often nonspecific (dyspnea, fatigue) and can be intermittent. This leads some patients to

delay seeking treatment, particularly if they associate the symptoms with deconditioning or part of the normal aging process.²⁶ Additionally, qualitative research indicates some healthcare providers dismiss patients' symptoms as insignificant or inappropriately attribute symptoms to other conditions (e.g. panic attacks),²⁷ likely contributing to delayed diagnosis. The presence, type, number, or severity of AF symptoms (i.e. nonspecific, intermittent) does not align with the risk of AF complications, such as ischemic stroke. The consequences of delayed or missed AF diagnosis can be profound (i.e. ischemic stroke), thus requiring vigilance to ensure AF is considered in the differential diagnosis when appropriate. In older adults and individuals with risk factors for AF, any potential AF symptoms warrant further evaluation for this highly prevalent condition.

The setting for evaluation and choice of diagnostic test (12-lead ECG, 24-hour Holter monitor, event monitor, loop recorder) should be guided by the patient's hemodynamic stability, the severity of AF symptoms, and the nature/frequency of symptoms.^{1,9} For example, a 12-lead ECG or 24-hour Holter monitor may be insufficient to diagnose paroxysmal AF in a patient that reports intermittent symptoms that only occur once weekly—in this situation longer-term monitoring would be more appropriate. Multiple options are available for longer-term monitoring including: external loop recorders that can be worn for up to 30 days and provide continuous and event monitoring; patch monitors (e.g. ZIO Patch), adhesive single-lead ECG devices that provide continuous and event monitoring for 1-3 weeks; implantable loop recorders that provide continuous and event recordings and last up to 3 years; or newer direct to consumer smartphone options, such as AliveCor® Kardia Mobile, a device that pairs with specific smartphones to provide 30-second single-lead ECG recordings at the moment an individual experiences symptoms.²⁸ Joint decision making to determine the most appropriate approach to monitoring should include consideration of the frequency and duration of symptoms and resource availability (i.e. provider that can implant a loop recorder; patient's ability and willingness to purchase a direct to consumer smartphone device). Direct to consumer smartphone devices were recently integrated into clinical practice guidelines as an option for post AF ablation arrhythmia recurrence monitoring. These devices offer a new option for long-term monitoring of AF recurrence, symptom management, and AF symptom-rhythm correlation. Smartphone ECG monitoring could be particularly useful in rural or low-resource areas where access to medical care is limited and/or requires traveling long distances.²⁹

NPs can advocate for patients to ensure that symptoms are appropriately managed, and that quality of life is optimized. To ensure a full cardiovascular risk factor evaluation is completed, referral to a cardiology or cardiac electrophysiology clinic is appropriate for patients initially diagnosed in another setting, such as primary care, when referral is feasible and available: Refer early if guidance is needed to select an appropriate antithrombotic treatment strategy. A complete discussion of initial AF evaluation is beyond the scope of this article, but should include the presence, type, and severity of symptoms and evaluation for underlying heart disease or reversible etiology (e.g. valvular disease, left ventricular hypertrophy, hyperthyroidism, heavy alcohol consumption).¹ Additional testing that may be required based on history, physical, and diagnostic exam results include: exercise testing, heart monitoring, transesophageal echocardiogram (i.e. if left atrial thrombus is suspected), and/or electrophysiological study (i.e. if atrial flutter is suspected as a predisposing factor for

AF).¹ Initial education should include informing patients of the importance of adherence to anticoagulation therapy even during asymptomatic periods, as asymptomatic or minimally-symptomatic status does not alter the risk of stroke.

Appropriate ventricular heart rate control (<80 beats per minute at rest¹) is essential both to prevent complications (tachycardia-mediated cardiomyopathy) and to manage symptoms. If the ventricular heart rate is sufficiently controlled but the patient remains symptomatic, the patient should be provided with rhythm-control options for the restoration and maintenance of sinus rhythm (e.g. antiarrhythmic medications, direct current cardioversion, or catheter ablation), which may require referral to a cardiac electrophysiology or AF specialty clinic.^{1,9} Particular attention should be paid to the sufficiency of symptom management in patient-groups that tend to perceive more severe AF symptoms (women and racial/ethnic minorities) yet receive procedural AF symptom management at lower rates. NPs can advocate for their female and racial/ethnic minority patients by ensuring timely referral to specialty providers that can provide advanced AF symptom management, and by educating patients on the full range of symptom management strategies available for AF.

Conclusion

NPs play an important role in chronic disease management. For patients with AF, the NP can provide caring reassurance regarding patients' AF symptoms and concerns, educate and treat patients based on evidence-based and consensus guidelines, and provide referrals to appropriate specialty providers to ensure the patient has access to all potential symptom management options.

Acknowledgments

Megan Streur is supported by the National Institute of Nursing Research/National Institutes of Health (T32 NR014833-01). The content of this manuscript is solely the responsibility of the author and does not necessarily represent official views of the National Institutes of Health.

References

1. January CT, Wann LS, Alpert JS, et al. 2014 AHA/ACC/HRS guideline for the management of patients with atrial fibrillation: Executive summary: A report of the American college of cardiology/American heart association task force on practice guidelines and the heart rhythm society. *Circulation*. 2014;130(23):2071–2104. [PubMed: 24682348]
2. Emdin CA, Wong CX, Hsiao AJ, et al. Atrial fibrillation as risk factor for cardiovascular disease and death in women compared to men: Systematic review and meta-analysis of cohort studies. *BMJ*. 2016;352:h7013.
3. Benjamin EJ, Virani SS, Callaway CW, et al. Heart disease and stroke statistics—2018 Update: A report from the American Heart Association. *Circulation*. 2018;137:e67–e492. [PubMed: 29386200]
4. Ruddox V, Sandven I, Munkhaugen J, Skattebu J, Edvardsen T, Otterstad JE. Atrial fibrillation and the risk for myocardial infarction, all-cause mortality and heart failure: A systematic review and meta-analysis. *Eur J Prev Cardiol*. 2017;24(14):1555–1566. [PubMed: 28617620]
5. Rienstra M, Lubitz SA, Mahida S, et al. Symptoms and functional status of patients with atrial fibrillation: State of the art and future research opportunities. *Circulation*. 2012;125(23):2933–2943. [PubMed: 22689930]
6. McCabe PJ, Schumacher K, Barnason SA. Living with atrial fibrillation: A qualitative study. *J Cardiovasc Nurs*. 2011;26(4):336–344. [PubMed: 21263348]

7. Colilla S, Crow A, Petkun W, Singer DE, Simon T, Liu X. Estimates of current and future incidence and prevalence of atrial fibrillation in the U.S. adult population. *Am J Cardiol.* 2013;112(8): 1142–1147. [PubMed: 23831166]
8. Shroff GR, Solid CA, Herzog CA. Atrial fibrillation, stroke, and anticoagulation in Medicare beneficiaries: trends by age, sex, and race, 1992–2010. *J Am Heart Assoc.* 2014;3(3):e000756. [PubMed: 24895161]
9. Kirchhof P, Benussi S, Kotecha D, et al. 2016 ESC guidelines for the management of atrial fibrillation developed in collaboration with EACTS. *Eur Heart J.* 2016;37(38):2893–2962. [PubMed: 27567408]
10. Pamukcu B, Lip GYH, Lane DA. Simplifying stroke risk stratification in atrial fibrillation patients: Implications of the CHA2DS2-VASc risk stratification scores. *Age Ageing.* 2010;39(5):533–535. doi: 10.1093/ageing/afq059. [PubMed: 20507847]
11. Rho RW, Page RL. Asymptomatic atrial fibrillation. *Prog Cardiovasc Dis.* 2005;48(2):79–87. doi: 10.1016/j.pcad.2005.06.005. [PubMed: 16253649]
12. Steg PG, Alam S, Chiang C, et al. Symptoms, functional status and quality of life in patients with controlled and uncontrolled atrial fibrillation: Data from the RealiseAF cross-sectional international registry. *Heart.* 2012;98(3):195–201. doi: 10.1136/heartjnl-2011-300550. [PubMed: 21948959]
13. Simantirakis EN, Papakonstantinou PE, Chlouverakis GI, et al. Asymptomatic versus symptomatic episodes in patients with paroxysmal atrial fibrillation via long-term monitoring with implantable loop recorders. *Int J Cardiol.* 2017;231:125–130. [PubMed: 28041713]
14. Mehall JR, Kohut RM, Schneeberger EW, Merrill WH, Wolf RK. Absence of correlation between symptoms and rhythm in “symptomatic” atrial fibrillation. *Ann Thorac Surg.* 2007;83(6):2118–2121. [PubMed: 17532409]
15. Pokushalov E, Romanov A, Katritsis DG, et al. Ganglionated plexus ablation vs linear ablation in patients undergoing pulmonary vein isolation for persistent/long-standing persistent atrial fibrillation: a randomized comparison. *Heart Rhythm.* 2013;10(9):1280–1286. [PubMed: 23608592]
16. Seaborn GEJ, Todd K, Michael KA, et al. Heart rate variability and procedural outcome in catheter ablation for atrial fibrillation. *Ann Noninvasive Electrocardiol.* 2014;19(1):23–33. [PubMed: 24112475]
17. Thompson TS, Barksdale DJ, Sears SF, Mounsey JP, Pursell I, Gehi AK. The effect of anxiety and depression on symptoms attributed to atrial fibrillation. *Pacing Clin Electrophysiol.* 2014;37(4): 439–446. [PubMed: 24215267]
18. Streur M, Ratcliffe SJ, Callans D, Shoemaker MB, Riegel B. Atrial fibrillation symptom clusters and associated clinical characteristics and outcomes: A cross-sectional secondary data analysis. *Eur J Cardiovasc Nurs.* 2018;1474515118778445. doi: 10.1177/1474515118778445.
19. Streur MM, Ratcliffe SJ, Callans DJ, Shoemaker MB, Riegel BJ. Atrial fibrillation symptom profiles associated with healthcare utilization: A latent class regression analysis. *Pacing Clin Electrophysiol.* 2018. doi: 10.1111/pace.13356.
20. Siontis KC, Gersh BJ, Killian JM, et al. Typical, atypical, and asymptomatic presentations of new-onset atrial fibrillation in the community: Characteristics and prognostic implications. *Heart Rhythm.* 2016;13(7):1418–1424. doi: 10.1016/j.hrthm.2016.03.003. [PubMed: 26961300]
21. Streur M, Ratcliffe SJ, Ball J, Stewart S, Riegel B. Symptom clusters in adults with chronic atrial fibrillation. *J Cardiovasc Nurs.* 2017;32(3):296–303. [PubMed: 27203271]
22. Piccini JP, Simon DN, Steinberg BA, et al. Differences in clinical and functional outcomes of atrial fibrillation in women and men: Two-year results from the ORBIT-AF registry. *JAMA Cardiol.* 2016;1(3):282–291. [PubMed: 27438106]
23. Goli NM, Thompson T, Sears SF, et al. Educational attainment is associated with atrial fibrillation symptom severity. *Pacing Clin Electrophysiol.* 2012;35(9):1090–1096. doi: 10.1111/j.1540-8159.2012.03482.x. [PubMed: 22817646]
24. Ugowe FE, Jackson LR, Thomas KL. Racial and ethnic differences in the prevalence, management, and outcomes in patients with atrial fibrillation: A systematic review. *Heart Rhythm.* 2018. doi: 10.1016/j.hrthm.2018.05.019.

25. Kassim NA, Althouse AD, Qin D, Leef G, Saba S. Gender differences in management and clinical outcomes of atrial fibrillation patients. *J Cardiol*. 2017;69(1):195–200. [PubMed: 27262176]
26. McCabe PJ, Rhudy LM, Chamberlain AM, DeVon HA. Fatigue, dyspnea, and intermittent symptoms are associated with treatment-seeking delay for symptoms of atrial fibrillation before diagnosis. *Eur J Cardiovasc Nurs*. 2016;15(6):459–468. [PubMed: 26318825]
27. McCabe PJ, Fhudy LM, DeVon HA. Patients' experiences from symptom onset to initial treatment for atrial fibrillation. *J Clin Nurs*. 2015;24(5–6):786–696. [PubMed: 25421608]
28. Calkins H, Hindricks G, Cappato R, et al. 2017 HRS/EHRA/ECAS/APHRS/SOLAECE expert consensus statement on catheter and surgical ablation of atrial fibrillation. *Heart Rhythm*. 2017;14(10):e275–e444. [PubMed: 28506916]
29. Evans GF, Shirk A, Maturi P, Soliman EZ. Feasibility of using mobile ECG recording technology to detect atrial fibrillation in low-resource settings. *Glob Heart*. 2017;12(4):285–289. [PubMed: 28302547]

Highlights

- Atrial fibrillation (AF) is characterized by heterogenous symptom presentation
- AF symptoms are often nonspecific: fatigue and dyspnea are common AF symptoms
- Timely diagnosis requires consideration of the often intermittent nature of AF