Chapter 5
Symptoms of Atrial Fibrillation

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Introduction

Atrial fibrillation (AF) is the most common clinically significant cardiac arrhythmia and affects over 5 million adults in the United States [1]. It is associated with considerable morbidity and mortality from complications such as heart failure, stroke, and other embolic sequelae. Although up to one third of patients with AF are asymptomatic, those who do experience symptoms of AF often seek emergency medical attention. Additionally, approximately 70 % of first detected AF episodes are diagnosed in the hospital or emergency room [2]. Recent data suggests that over two thirds of patients diagnosed with AF in the emergency department are eventually admitted to the hospital [3]. Therapeutic strategies aim to not only reduce associated morbidity and mortality but also control associated symptoms. Multiple studies have demonstrated that long-term clinical outcomes based on rate versus rhythm control are similar; therefore, an individualized approach based on arrhythmia-related symptoms remains an additional factor when determining treatment goals [4–7]. There are significant costs and complications associated with pharmacologic and non-pharmacologic invasive treatments for AF from a symptom standpoint, making appropriate symptom assessment imperative. However, there is no accepted gold standard for assessing symptoms in AF given its variable nature. The aims of this chapter are to review the symptoms associated with AF and describe their proposed mechanisms, briefly discuss symptom scoring tools, and describe targeted symptom management.

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Symptoms

The symptoms associated with AF are extremely variable and can range from an asymptomatic incidental electrocardiographic (ECG) finding to overt signs of acute heart failure (Table 5.1). However, it is difficult to attribute symptoms of AF solely to the arrhythmia as many of these patients have multiple comorbid conditions such as heart failure or valvular disease which could cause similar symptoms. In fact, up to 90 % of those with AF have been found to have a comorbid condition [8]. Additionally, there exists both inter-patient and intra-patient symptom variability. Symptoms in the same patient can differ based on the disease course, as well. Two large prospective studies by Nabauer et al. and Lévy et al. characterized the numerous clinical presentations observed in the AF population [9, 10]. They were also able to describe symptoms based on type of AF. Their findings along with other selected studies which evaluated symptoms of AF are presented in Table 5.2 [9–12]. The next section will review symptoms that have been associated with AF, with the caveat that coexisting conditions likely play a role or can be primarily responsible for symptom association.

Palpitations

Up to one half of patients with AF may experience the awareness of their irregular heartbeat [9–11]. Palpitations are the most common presenting symptom associated with paroxysmal AF [9, 10]. In fact, palpitations may be the only symptom that occurs more often during an episode of AF compared to sinus rhythm. However, the mechanisms responsible for palpitations have not been fully elucidated. The neural pathways responsible for palpations are unknown and may not even originate from the myocardium itself. Interestingly, denervation of the heart in heart transplant recipients does not prevent the sensation of palpitations [13, 14].

Table 5.1 Symptoms of atrial fibrillation

Palpitations
Dyspnea
Chest discomfort, chest pressure, chest pain
Reduced exercise tolerance
Dizziness, presyncope, syncope
Anxiety
Depression
Fatigue
Polyuria

Table 5.2 Selected trials evaluating symptoms of atrial fibrillation (AF)

		Palpitations	Dyspnea	Chest Pain/discomfort	Syncope, dizzy	Fatigue	Other	None
Nabauer et al. [9][a]	Total ($n=8942$)	41.9	44.3	18.7	25.3	44.9	–	24.5
	Paroxysmal ($n=3928$)[b]	54.7	40.2	21.6	28.3	48.1	–	20.3
	Persistent ($n=1873$)[c]	41.4	47.5	18.8	24.9	49.0	–	23.3
	Permanent ($n=3141$)[d]	26.1	47.5	15.1	21.9	38.4	–	30.4
Lévy et al. [10]	Total ($n=756$)	54.1	44.4	10.1	10.4	14.3	0.9	11.4
	Paroxysmal ($n=167$)†	79.0	22.8	13.2	17.4	12.6	0.0	5.4
	Persistent ($n=200$)[e]	51.5	58.0	11.0	9.5	18.0	0.0	7.0
	Chronic ($n=389$)[f]	44.7	46.8	8.2	8.0	13.1	1.8	16.2
Lok et al. [11]	Total ($n=291$)	42.3	38.1	7.9	16.5	–	–	–
Lip et al. [12]	Total ($n=170$)	25.9	51.8	34.1	18.8	–	–	–

All values represented as percentages (%) unless stated otherwise

[a]Number in each group and percentages were calculated based on published data

[b]Includes first detected AF episode, paroxysmal defined as AF that lasts less than 7 days

[c]Defined as recurrent or sustained AF that lasts more than 7 days

[d]Defined as long-standing AF in which cardioversion has failed or has not been attempted

[e]Defined as AF lasting greater than or equal to 7 days but less than 1 month

[f]Defined as AF present for greater than 1 month

Dyspnea

Dyspnea is also a common symptom and can occur in over 40% of those with AF [9, 10, 12]. Studies demonstrate that dyspnea is the most common presenting symptom of longer-duration AF, such as persistent or permanent AF, which is common among the elderly [9, 10]. The mechanism responsible for dyspnea may be an increase in left-sided pressures including an elevated mean pulmonary wedge pressure and a reduction in stroke volume, however, left ventricular end-diastolic pressure was found to be decreased, in one study that compared induced AF [15]. A secondary tachycardiomyopathy may be another cause of dyspnea in AF [16, 17]. Dyspnea is also one of the most common symptoms in heart failure and may cloud the picture as AF and congestive heart failure (CHF) are closely related and often predict each other's development.

Reduced Exercise Tolerance

Reduced exercise tolerance is also common and may occur in over half of AF patients but can be confused with dyspnea [18, 19]. However, exercise tolerance has been shown to improve after conversion of AF to sinus rhythm [18]. It is estimated that AF can cause a reduction in exercise tolerance by up to 20% [19]. There is some suggestion that increased heart rate variability is associated with improved exercise tolerance [20].

Chest Discomfort, Pressure, Pain

Chest pain may occur in 10–20% of patients with AF although other studies have documented higher rates [9–12]. Such symptomatology may relate to impairment in myocardial perfusion or increased coronary artery resistance and can be present even in those without coronary disease or critical valvular disease [20–22]. Chest pain is present in those with rapid ventricular rates and in those with slow ventricular rates so chest pains are likely not purely rate related and involve other unknown mechanisms [22]. Derangements in the renin-angiotensin and sympathetic systems may also play a role in the sensation of chest pain [21, 22].

Dizziness, Presyncope, Syncope

Dizziness or syncope may occur in up to one quarter of patients with AF [9]. There is suspected to be a very complex interplay between the sympathetic and parasympathetic nervous systems in AF which may explain these symptoms [20]. In fact, Holter monitor data demonstrates that sympathovagal imbalance may cause such

symptoms [23]. Other suspected mechanisms include hemodynamic compromise from the arrhythmia, although this is not as likely without an underlying bypass tract or structural disease [15]. Pauses associated with sinus node dysfunction are another proposed mechanism [16].

Other Symptoms

Anxiety, depression, and fatigue have also been documented symptoms of AF [24]. Almost one third of patients with AF may have depression and anxiety [24]. Symptoms of depression can predict quality of life and atrial fibrillation recurrence after cardioversion [24, 25]. Polyuria from release of atrial natriuretic peptide has also been described [26]. Additionally, 15–25 % of patients with AF present with stroke from embolic phenomenon [4, 27]. Therefore, when evaluating patients with stroke or transient ischemic events, a history of AF may not be present as the cerebrovascular event may be the presenting episode.

Asymptomatic

One of the main challenges in identifying AF is that 11–32 % of those with AF are asymptomatic [4, 9, 10, 28, 29]. Much of this data is derived from the Atrial Fibrillation Follow-up Investigation of Rhythm Management (AFFIRM) study and patients with implantable pacemakers or defibrillators [4, 30–33]. When studies evaluated symptomatic calls in those with implantable devices, approximately 31 % of calls were made when patients were in normal sinus rhythm and 69 % while they were in AF [32]. Another study demonstrated that almost 65 % of documented AF episodes were asymptomatic [33]. Ambulatory monitoring studies have demonstrated that the ratio of asymptomatic to symptomatic AF episodes was approximately 12:1 [30]. Therefore, symptoms are an unreliable diagnostic tool overall; however, symptoms remain the leading cause of seeking medical care in those with AF.

A study evaluating AF in post-cardiac surgery patients demonstrated that a first documented episode of AF could be detected up to 21 days post operation, the majority of which were asymptomatic (69 %); the second most common symptom was palpitations (17 %) in this group [14].

Although we have identified symptoms which may be attributed to AF, we do not understand why some patients are symptomatic while others remain asymptomatic. The AFFIRM study did find that those who were asymptomatic were more often male; had lower incidence of coronary disease, heart failure, and pulmonary disease; and had better left ventricular function [4]. However, asymptomatic patients were more likely to present with cerebrovascular events, possibly from delayed medical treatment during their asymptomatic state [4]. Additionally, in those with a longer duration of AF or those who develop permanent or persistent AF, symptoms

may actually reduce or disappear [5, 10, 11]. Interestingly, patients with symptomatic paroxysmal AF have been found to have a tenfold greater likelihood of having an asymptomatic recurrence [30].

Additionally, ventricular rates may play a role in symptom generation. The suppression of paroxysmal atrial tachyarrhythmia trial (SOPAT) and AFFIRM demonstrated a direct correlation between ventricular rate and symptoms of the arrhythmia [4, 34]. Other studies have been unable to establish such a relationship [4, 34–36].

Symptom Scoring

As described above, the symptoms of AF are variable and often overlap with comorbid conditions. Therefore, symptom scoring tools have been created in an attempt to objectify such subjective and variable data. In a short stay unit, such tools are likely less practical; however, they do deserve brief mentioning. Recently, a large push has been made to better characterize symptoms of AF, mainly to better assess optimal management strategies in clinical trials. Tools such as the University of Toronto Atrial Fibrillation Severity Scale, the Canadian Cardiovascular Society Severity of Atrial Fibrillation Scale, European Heart Rhythm Association (EHRA) scale, and the Short Form 36 have all been utilized [37–41]. However, the clinical utility of these scoring systems is unknown. A major criticism of these scoring tools is the difficulty in capturing symptoms attributed to AF versus comorbid conditions.

Symptom-Directed Therapies

Other chapters will address management of atrial fibrillation; however, a brief discussion regarding symptom-directed therapies is warranted. Targeted treatment directed at symptoms has been evaluated in multiple studies. When comparing rate versus rhythm control strategies for AF, no significant difference was found in symptom improvement [4–6, 42, 43]. However, other studies have demonstrated that restoring and maintaining sinus rhythm improved symptoms and functional status [18]. Other studies also showed improvement in exercise capacity with cardioversion as the rhythm control strategy [2, 19, 44, 45]. Additionally, AV node ablation with pacemaker placement did demonstrate improved symptom scores, quality of life, and functional status [46, 47]. Several studies have evaluated the use of pulmonary vein isolation and its effects on symptoms, exercise capacity, and quality of life and found that these parameters were in fact improved [48, 49]. It has been shown, regardless, that if symptoms were improved by a specific strategy, those with more severe symptoms benefited the most.

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