Atrial Fibrillation in the Elderly

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Atrial fibrillation (AF) is the most common sustainable arrhythmia in the elderly (1,2) being considered by some "the disease of the elderly", due to its high prevalence and incidence, which double every ten years in individuals over the age of 60 years. In patients over 75 years of age, its incidence is approximately 10%, being around 27% in individuals over 90 years old (2, 3). (Table1)

Table 1 - Prevalence of AF according to age.

AGE	**PREVALENCE** p/ 1000 patients
25 – 35 years	2 – 3
50 – 60 years	30 – 40
> 60 years	50 - 90

Source: Tresch DD.2001.

AF in the elderly may occur alone (in the absence of structural cardiopathy or systemic arterial hypertension) or as a result of structural fibrotic and electrophysiological alterations in the atrial myocardium, sinus node and conduction system, inherent in the aging process. However, in the Cardiovascular Health Study, (4) the prevalence of AF was significantly greater among patients with cardiovascular disease, when compared with those without cardiopathy (9.4% vs. 1.6%, respectively). Among the cardiopathies most frequently associated with AF are coronary arterial disease (CAD), systemic arterial hypertension and valvopathies, especially the mitral and aortic. (5) In the elderly, the subclinical hyperthyroidism (normal T3 and T4 with low TSH) causes a threefold increase in the risk of atrial fibrillation. In these patients, hyperthyroidism is atypical and known as apathetic hyperthyroidism (6).

Other frequent causes are sinus node dysfunction and dilated myocardiopathy in its advanced phase - both associated with AF, with a low ventricular response and the tachycardia-bradycardia

syndrome (recurrent paroxysmal AF with spontaneous stop followed by a long pause or even asystole).

It is considered a risk factor for death and independent stroke, the risk of which progressively increases with age. (7) AF patients have a higher cardiac morbidity and mortality (relative risk of 2.0 for men and 2.7 for women) and greater overall mortality (relative risk of 1.7 for men and 1.8 for women) than patients of the same age without AF. (8)

Clinical Manifestations

In some patients, AF can be completely asymptomatic and discovered by chance on the electrocardiogram carried out as a routine evaluation.

Others present mild symptoms, such as palpitation, thoracic discomfort, asthenia, shortness of breath, decreased tolerance to exercises, sudoresis, polyuria.

The type and severity of symptoms related to AF are primarily related to the ventricular response and the gravity of the underlying disturbance, expressed by the left ventricular function.

The presence of underlying cardiac disease and comorbidities makes the elderly less able tolerate the paroxysms of AF, which are usually symptomatic, most frequently with angina, decompensation or the development of congestive heart failure or pre-syncope.

1. **Angina** may occur even in the absence of significant CAD in those with LVH and diastolic dysfunction. In postinfarction patients, the increase in intra-atrial pressure, whether by left ventricular diastolic dysfunction, mitral regurgitation caused by dysfunction of the papillary muscle or atrial ischemia, is the triggering factor of AF with high ventricular frequency. The high ventricular response may increase the ischemic area in these patients and worsen the prognosis. (3)

2. **Worsening or development of congestive heart failure** occurs in an insidious and progressive fashion, causing a deterioration of the functional class, even in individuals with no structural cardiac disease, constituting the so-called tachycardiomyopathy. The development of cardiomegaly, mitral regurgitation and progression depression of the left ventricular function is noted. Tachycardiomyopathy develops even in those patients with heart rate apparently controlled when at rest, but inadequately controlled on physical effort. The treatment of AF commonly improves and even normalizes ventricular function.

3. **Pre-syncope** develops as a result of the hypoflow to the brain as a result of low cardiac output due to the high ventricular rate or lack of atrial contraction, particularly in those with systolic dysfunction and/or left ventricular diastolic dysfunction, aortic stenosis, mitral stenosis and hypertensive cardiopathy.

4. Systemic or cerebral arterial embolism can emerge as an initial manifestation of AF, accounting for 15 to 20% of all strokes, 50% of which are of nonvascular etiology. (9) According to data from the *Framingham* study, the presence of AF is an independent risk factor for cardiopathy and the major precursor of stroke in the elderly, the severity of which results from the size of the emboli, which are usually big and often occlude an artery, thus causing severe neurological deficits and even death (which occurs in up to 70% of cases). Permanent AF is also associated with silent thromboembolic (asymptomatic) events which, when associated with the chronic decrease in the flow of blood to the brain and cerebrovascular alterations typical of old age, account for mild, but progressive, cognitive and motor deficits, such as slowness, lack of motor coordination and dementia, which may go unnoticed in their initial phase and thus delay the diagnosis (9). An analysis of clinical studies on secondary prevention of thromboembolism in the elderly with AF showed that patients over 75 years of age with a single risk factor for thromboembolic events have a risk greater than 8% per year of having a stroke, exceeding the 12% in those with a previous history of thromboembolic events. (10, 11, 12) The risk varies according to the presence of clinical and echocardiography findings associated with thrombophilia (Table 2).

Table 2 - Clinical and echocardiography parameters associated with a greater risk of stroke

Clinical parameters
Hypertension
Heart failure
Prior thromboembolic events
Echocardiographic parameters
Atrial enlargement
Left ventricular dysfunction
Mitral annular calcification
Spontaneous echo contrast in left atrium
Reduced flow velocity in left atrium and left atrial appendage
Decreased contractility of left atrium

Clinical evaluation

The initial approach to the patient with AF should follow this sequence: control of heart rate, identification and treatment of the cause of arrhythmia, evaluation of the risk of anticoagulation and the benefit of cardioversion to sinus rhythm.

The rapid control of heart rate is fundamental in the elderly, especially in order to avoid the deterioration of ventricular function and alleviate symptoms. If signs and symptoms of hemodynamic instability (mental confusion, torpor, cold sudoresis, dyspnea, chest pain suggestive of angina and syncope) are present or if heart rate is very high (> 240 bpm), direct-current cardioversion with 200J should be performed. Digoxin is not efficient in controlling heart rate or in preventing an increase in ventricular rate in the elderly during exercise and is therefore not the

drug of choice for this population, in whom side effects are also more common. The decline in renal glomerular filtration rate observed in the elderly population, even at serum levels of creatinine considered normal, particularly among those with a low body mass index, may reduce the excretion of digoxin. The risk is even greater in patients with heart failure (HF), a condition which reduces the renal clearance of digoxin (13, 14). In bed-ridden patients with HF, in whom the use of beta-blockers or calcium channel blockers is contraindicated, digoxin may be used with caution. The usual doses in the elderly are 0.0635 to 0.125 mg per day. If the cause of AF, however, is decompensated HF, digoxin is effective in improving the symptomatology secondary to the improvement in left ventricular function, decreased sympathetic tonus and mild vagotonic action in the atrioventricular node, an improvement which occurs in spite of the slightly decreased heart rate. In some cases, the mere improvement in left ventricular function results in the spontaneous reversion of AF. If hemodynamic involvement is not present, the control of heart rate can be achieved with -blockers or calcium channel blockers. In those patients in whom it is difficult to determine whether AF is the cause or consequence of hemodynamic decompensation, small doses of digital (0.10 mg in lanactoside C intravenous bolus) should be prescribed. In the event of any evidence of worsening of the left ventricular function, direct-current cardioversion should be performed. Ventricular response is rarely refractory to drugs (15). In these cases, A-V node modification or radiofrequency ablation may be indicated with the same degree of safety as in younger patients. A not infrequent problem in this age group is the tachycardia-bradycardia syndrome, in which AF is a transitional condition and sinus node dysfunction is the underlying disease. In such patients, the control of heart rate using only drugs is disastrous. A combination of drugs that modify the A-V conduction and a pacemaker is the safest treatment procedure.

Determining and removing the cause of arrhythmia should be the next step in the control of heart rate. Data from the clinical history, physical examination and laboratory tests can detect hydroelectrolytic disorders, infection (mainly respiratory), anemia, hypoxemia, hyperthyroidism and structural cardiopathy. The echocardiogram has a central role in the evaluation and treatment of patients with AF, regardless of age, not only in establishing the cause but also in predicting the risk of thromboembolism and the recurrence of arrhythmia, as well as guiding the strategy of treatment.

Anticoagulation in the elderly patient is of fundamental importance, as advanced age alone (especially in women) is an independent risk factor for stroke in patients with nonvalvar AF. (1, 10, 11, 12,16) The presence of comorbidities, common in this age group, such as HAS, diabetes mellitus (DM), left ventricular dysfunction, heart failure and a previous history of stroke or other thromboembolic event further increases the risk of thromboembolic events in this population.

Recent studies have shown reduction of up to 68% in the incidence of stroke and of 33% in mortality in patients with nonvalvar AF in those anticoagulated with warfarin, with lower rates in those using aspirin (20 to 25% reduction in strokes). (10, 11) Based on data from more recent clinical and epidemiological studies, a recommendation was made by the *American College of Cardiology and American Heart Association* (ACC/AHA) regarding the anticoagulation of patients with AF. These guidelines consider age and the presence or absence of a risk factor of thromboembolic events in defining whether there is a need for anticoagulation, as well as the drug to be used (Tables 3 and 4). Patients considered to be at high risk for thromboembolic events are those aged 75 years or more, regardless of the presence or absence of any other risk factor for thromboembolism, and those with one or more risk factors for thromboembolic phenomena or AF associated with mitral stenosis, users of a mechanical prosthesis and those with a previous history of thromboembolic events. These patients should receive warfarin in the dose required to reach an INR of between 2 and 3 (17). The elderly are usually more sensitive and have a greater lability with stable doses of oral anticoagulants. For this reason, smaller doses are normally used. It is recommended to start with one half of the dose habitually used for maintenance, which is 2.5 mg daily, corresponding to half a 5-mg warfarin tablet on alternate days. Factors associated with a greater risk of bleeding have been described, especially a previous history of bleeding, comorbidities such as HF and hepatopathy, difficulty in understanding the care required with anticoagulation, alcoholism and recurrent falls (18) (Table 5).

Table 3 Anticoagulation of elderly patients with AF/persistent flutter lasting over 48 h or of undefined or permanent duration.

Risk category	*Recommended treatment*	
No risk factor	***Aspirin in a dose of 81 to 325 mg per day***	
Presence of 1 moderate risk factor	***Aspirin a dose oft 81 to 325 mg per day*** or ***Warfarin (INR between 2-3, with a target of 2.5)***	
Presence of 1 high risk factor or more than 1 moderate risk factor	***Warfarin (INR between 2-3, to achieve the target INR of 2.5; for patients with a mechanical valve, the target is an INR > 2.5)***	
Risk factors for thromboembolism in AF		
Minor risk factors	**Moderate risk factors**	**High risk factors**
Female	**Age ≥ 75 years**	**Any previous thromboembolic event**
Age between 65 and 74 years	**Hypertension**	**Mechanical heart valves**
Coronay artery disease	**Heart failure**	**Mitral stenosis**
Hyperthyroidism	**FE □ 0.35**	
	Diabetes Mellitus	

Table 4 Anticoagulation of elderly patients with AF/persistent atrial flutter based on the risk of thromboembolism according to ACC/AHA/ESC Practice Guidelines/2006.

Characteristics of patient	Antithrombolic therapy recommended	Class of recommendation
60 to 74 years with no risk factor	Aspirin 81 to 325 mg/d or no antithrombolic therapy	I
65 to 74 years with DM or CAD	Warfarin with INR 2-3	I
75 years or more, female	Warfarin with INR 2-3	I
75 years or more with no risk factor	Warfarin with INR 2-3 or Aspirin 81 to 325 mg/d	I
65 years or more with CCI	Warfarin with INR 2-3	I
EF□ 0.35 or shortening fraction □ 0.25 in the hypertense	Warfarin with INR 2-3	I
Mitral stenosis	Warfarin with INR 2-3	I
Mechanical heart valves	Warfarin with INR 2-3 (or higher)	I
Previous thromboembolism	Warfarin with INR 2-3	I
Persistent atrial thrombus by transesophageal echocardiography	Warfarin with INR 2-3	IIa

Patients in whom the use of warfarin as the drug of choice is contraindicated can use aspirin, since it also reduces stroke and death, although to a lesser extent. Despite the proven benefits of warfarin and its safety in the elderly when the INR is maintained within the therapeutic range, up to 50 to 70% of the elderly patients eligible for anticoagulation do not go through with it and among the few who do so, its effectiveness is often less than optimal (1, 11,17).

Table 5 Risk factors for bleeding in the elderly using oral anticoagulants

Risk Factor	**Potential Clinical Characteristic**
History of bleeding	Gastrointestinal and urinary bleeding, epistaxis
Drugs that cause bleeding	Non-hormonal anti-inflammatory drugs
Drugs that potentialize warfarin	Amiodarone, Erythromicin
Comorbidities	Heart failure, hepatopathy
Reduced adherence to treatment	Cognitive disturbance, lack of family support
Alcoholism	
Trauma	Recurrent falls

Reversion to sinus rhythm should be evaluated only after heart rate has been controlled and the patient is asymptomatic. This decision should be made after a joint assessment of the data from the clinical history and the complementary examinations, in relation to the likelihood of recurrence and reduction of morbidity and mortality. There are no data indicating any greater benefit when an elderly patient converts to a normal sinus rhythm rather than maintaining AF rhythm with appropriate control of heart rate and chronic anticoagulation. The results of the *Atrial Fibrillation Follow-up Investigation of Rhythm Management (AFFIRM)* showed no differences in the reduction of overall mortality with regard to either modality of treatment, particularly in individuals with HF and the elderly. Restoring and maintaining sinus rhythm involves the use of antiarrhythmic drugs, which are associated with side effects that are more frequent in the elderly. For this reason and in view of the high prevalence of HF in this age group, amiodarone has been suggested as the drug

of choice for maintaining sinus rhythm. Nonpharmacological methods (pacemaker, ablation, implantable cardioversor-defibrillator and Mazze surgery) to maintain sinus rhythm in the elderly are still regarded as investigative and, because they are invasive, their role in this age group has still to be defined (19).

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