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Atrial Fibrillation: Epidemiological, Etiological and Hospital Management Aspects in Thies (Senegal)

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Abstract

Introduction: The objective of this work was to describe the epidemiological, etiological, clinical and therapeutic aspects of atrial fibrillation (AF) in Thies, Senegal. **Materials and Methods:** This was a retrospective, multicentre, descriptive study from February 1st, to May 28th, 2019 carried out in the 3 hospitals of the city of Thies that focused on patients with AF documented by an ECG. Valvular and non-valvular AF classification was used and the CHA2DS2-VASc score was used to assess thromboembolic risk. **Results:** We collected 67 patients with a female predominance (M/F sex ratio of 0.71). The prevalence of AF was 1.7%. The average age of patients was 66.67 ± 13.48 years. Forty-eight patients (71.64%) had palpitations and 32 patients (47.76%) had heart failure. Hypertension was the most common etiological factor found in 41 patients (61.19%) followed by rheumatic valvular disease in 25 patients (37.31%). The non-valvular AF was found in 42 patients (62.69%) of which 34 (80.95%) had a CHA2DS2-VASc score ≥ 2. Vitamin K antagonists (VKAs) were prescribed in 47 patients (79.66%) and aspirin alone in 12 patients (20.34%). Direct Oral Anticoagulants (DOACs) were not prescribed in any patient. Seven patients (10.44%) had a medical regulator treatment and no electrical cardioversion was performed. **Conclusion:** AF was a frequent rhythm disorder. Hypertension and rheumatic mitral valve disease were the most frequently associated etiological factors. The diagnosis was often late in the heart failure stage. Anticoagulant treatment was insufficiently prescribed and based exclusively on VKAs.

Keywords

Atrial Fibrillation, Hypertension, Rheumatic Heart Disease, Anticoagulant,

Senegal

1. Introduction

Atrial fibrillation (AF) is the most common sustained heart rhythm disorder [1] [2]. It is associated with an increased risk of stroke, heart failure and mortality [2] [3]. Data on AF in Africa in general and in health facilities outside capital cities in particular are scarce. The purpose of this work was to report the epidemiological, etiological, clinical and therapeutic aspects of AF in the city of Thies.

2. Patients and Methods

This was four months, multicentre, retrospective, descriptive study from February 1st to May 28th, 2019 with in-patient or outpatient records and documented AF at 12 leads electrocardiogram (ECG) in the 3 hospitals of the city of Thies. A survey sheet made it possible to collect standardized socio-demographic, clinical, para-clinical and therapeutic data. Sex and age were specified; the history, lifestyle and clinical examination data. Physical inactivity was defined as the absence of daily physical activity or physical activity of <120 minutes per week. At the paraclinical level, patients benefited from a Doppler echocardiography that specified whether or not there was a structural or functional abnormality. Other explorations were carried out according to etiological orientation. Valvular and non-valvular AF classification was used and the CHA2DS2-VASc score was used to assess thromboembolic risk.

2.1. Ethical Considerations

The data were used in complete confidentiality.

2.2. Data Capture and Analysis

The data was collected and analyzed with the statistical tools of the software Epi info version 3.5.1 of the CDC Atlanta (USA). The Khi-square comparison test was used for the comparison of proportions and the Variant Analysis Test (ANOVA) for the comparison of a quantitative variable to a qualitative group variable after completion of validity tests. The significance threshold was set at $p \leq 0.05$.

3. Results

Sixty-seven (67) patients were enrolled during the study period. Sixty-seven patients out of 3,969 patients had AF or a prevalence of 1.7%. The female sex predominated with a M/F sex ratio of 0.7. The average age of patients was 66.67 ± 13.48 years (extremes of 28 and 94 years). Women with AF were significantly younger than men with an average age of 63.56 and 71 respectively ($p = 0.04$)

Clinically, 48 patients (71.64%) had palpitations, 32 patients (47.76%) had

heart failure and 8 patients (11.94%) had ischemic stroke. Hypertension was the most common etiological factor, observed in 41 patients (61.19) followed by physical inactivity in 24 patients (35.82%), diabetes in 9 patients (13.43%), pneumonia in 5 patients (7.46%), hyperthyroidism in 4 patients (5.9%) and alcohol and tobacco consumption in 2 patients (3%) (Table 1).

At ECG, the mean ventricular frequency was 98 ± 27.72 beats/min in women and 100 ± 28.61 beats/min in men (p = 0.81%). Other abnormalities were left ventricular hypertrophy (LVH) in 22 patients (32.83%), right ventricular hypertrophy (RVH) in 4 patients (5.97%), myocardial ischemia in 11 patients (6.40%) and necrosis Q-wave in 4 patients (5.97%).

Echocardiography was found in 56 patients (83.58%) and was associated with rheumatic valve disease in 25 patients (44.64%). It was mitral regurgitation in 14 patients (56%) followed by mitral stenosis (n = 7; 28%), mitral and aortic polyvalvular disease in 4 patients (n = 4; 16%). Pericarditis was observed in 1 patient (1.78%). The left and/or right atrium was dilated in 71.42% of cases (n = 40) with an average left atrium area of 31.60 cm^2 ± 14.08 (11 and 72 extremes) for females and 27 ± 10.82 for males (12 and 44 extremes) (p = 0.33). The average area of the right atrium was 24.94 cm^2 ± 15.92 (extremes 8 and 84) for women and 19.91 ± 6.85 (extremes 10 and 32) for men (p = 0.31). A change in left ventricular systolic function was found in 13 patients (23.21%) of which 5 were likely ischemic (8.92%).

In total, non-valvular AF was found in 42 patients (62.69%) of whom 34 (80.95%) had a CHA2DS2-VASc score ≥ 2; 59 patients (88%) had a high thromboembolic risk. Of the 59 patients with a CHA2DS2-VASC score ≥ 2, 43 patients were prescribed VKAs therapy with a prescription rate of 72.88%. Aspirin alone was prescribed to 13 patients (17.91%). DOACs were not prescribed to any patient.

The INR result in VKAs patients was found in 41 patients: it was < 2 in 29.26% of patients (n = 12), between [2] and [3] in 34.15% of cases (n = 14) and > 3 in 36.59% of patients (n = 15) (Table 2).

Heart rate-slowing treatment was introduced in 55 patients (82.09%) represented

Table 1. Distribution of patients by AF etiological factors.

Etiological risk factors	Number	Percentage
Hypertension	41	61.19
Physical inactivity	24	35.82
Diabetes	9	13.43
Lung disease	5	7.46
Hyperthyroidism	4	5.9
Tobacco	2	3
Alcohol consumption	2	3

AF: atrial fibrillation.

by digoxin in 25 patients (45.45%), a beta-blocker in 21 patients (38.18%), a calcium channel blocker in 8 patients (14.54%) and a combination of 2 heart-rate slowing treatment was found in 1 patient (1.81%). Seven patients (10.44%) had a pharmacological cardioversion and none had an electrical cardioversion (Table 3).

The general characteristics of patients are summarised in Table 4.

Table 2. Distribution of VKAs patients according to INR results.

INR	Number	Percentage %	Cumulated Percentage %
<2	12	29.26	29.26
[2 - 3]	14	34.15	63.41
>3	15	36.59	100
Total	41	100	100

VKAs: Vitamin K antagonists

Table 3. Distribution of patients by target heart rate therapy.

Treatment	Number	Percentage %	Cum. Percentage %
Digoxin	25	45.46	45.46
Beta blocker	21	38.18	83.64
Calcium channel blocker	8	14.55	98.19
Combination of 2 antiarrhythmics	1	1.81	100
Total	55	100	100

Table 4. General patient characteristics.

Age	66.67 ± 13.48
Sex ratio M/F	0.7
Palpitations	71.64%
Heart failure	47.76%
Stroke	11.94%
Valvular AF	46.64%
Ischemic heart disease	8.92%
High thromboembolic risk	88.06%
Patients treated with VKAs	79.66%
Patients treated with Aspirin alone	17.9%
Patients treated with DOACs	0%
Patients with chemical cardioversion attempt	10.44%
Patients with electric cardioversion	0%

AF: atrial fibrillation; VKAs: vitamin K antagonists; DOACs: direct anticoagulants.

4. Discussion

The prevalence of atrial fibrillation was 1.7% in our work. Its epidemiology varies from one country to another. In sub-Saharan Africa, this prevalence is estimated at between 2.82% and 8.68% [4] [5]. The low prevalence in our work of AF could be explained by the short 4-months duration of our study and by the study framework which was services that did not only receive patients from cardiology.

The average age of patients in our work was 66.67 years. An average age above 65 years in patients with AF is widely reported in the literature [5] [6] [7]. The average age of women was 63.56 years, that of men 71 years ($p = 0.04$). However, in the work of Mbaye [8], the patients were younger with an average age of 57.06 years. It is well established that the prevalence of AF increases with age and significantly after age 65 [1] [7].

We found in our work a female predominance with a sex ratio of 0.71. This female predominance was also found by several authors such as Mbaye [8] and Benjamin [9]. Shavadia, on the other hand, reported a male predominance with a sex ratio of 1.27 [6].

Hypertension was the most common etiological factor found in 61.19% of patients in our work, lower than the 68% found by Shavadia [6] but higher than the 50% and 51.42% found by Benjamin [9] and Coulibaly [4]. Hypertension is a risk factor for AF widely reported in the literature and growing in our countries reflecting an epidemiological transition [2] [5] [6]. The second etiological factor found in our study was rheumatic valve disease, at 46.64%. This valvular disease prevalence in patients with AF was similar to that found by Mbaye [8] but higher than the 36% reported by Diop [5]. The mitral valve is most frequently affected by acute rheumatism as reported in the literature [10]. The proportion of diabetes was 13.43% in our work. This proportion was lower than the 39% and 33% found by Rgbaoui [11] and Shavadia [3].

Non-valvular AF was predominant in our work with a prevalence of 62.69% of patients. This finding is consistent with those found by Diop [5] who found a similar 64% non-valvular AF frequency. The probable ischemic etiology in our work is estimated at 8.92%, higher than the frequency of 2.3% found by Mbaye [8], but lower than the 12% and 25% found respectively by Coulibaly and Diop [4] [5].

Palpitation was the most common symptomatology of AF found in our work and in the literature [5] [8]. Heart failure was found with a prevalence of 47.76% in our study. This is similar to Gentric's finding of 47% FA-associated heart failure [12]. Fassa [2], Coulibaly [4] and Diop [5] had higher rates of heart failure, 58%, 77% and 64% of cases, respectively. Nieuwlaat found that heart failure was known in 34% of AF patients, and AF in 42% of patients with heart failure. AF can be both a cause and a consequence of heart failure [13]. Eight patients (11.94%) in our work had an ischemic stroke. This proportion is lower than that found in the literature by Mbaye [8] and Shavadia [6] with 14.7% and 15% re-

spectively.

Electrocardiographic abnormalities associated with AF are dominated by LVH and ischemia in 32.83% and 16.40% of cases, respectively. These results are consistent with those found by Fassa [2] who found an LVH frequency in 40% of cases.

In echocardiography, the mean left ventricular ejection fraction (LVEF) was 60% in our patients. LV systolic dysfunction was observed in 13 patients or 19.40%. These results are similar to those found by Coulibaly [4] and Mbaye [8]. Echocardiography also found dilated atria in 71.88% of cases. The high frequency of atrial dilation with ultrasound is reported in the majority of studies [2] [14] [15].

In our work, 56 patients (83.58%) received heart rate-slowing therapy and 7 patients (10.44%) benefited from an amiodarone chemical cardioversion attempt. This preponderance of slowing treatment associated with anticoagulant treatment is found by various authors [5] [6] [8] and complies with the new recommendations on the management of AF [16]. In our work, 43 of the 59 patients with a CHA2DS2-VASC 2 score, or a prescription rate of 72.88%, were prescribed VKAs. This prescription rate although low is nevertheless higher than the rates of 22% and 64% found respectively by Coulibaly and Shavadia [4] [6]. This under-prescription of VKAs could be explained by the fear of iatrogenia, given the difficulties to evaluate this treatment by regular monitoring of INR in some patients. INR under AVK was within the therapeutic range in 34.15% of patients, however it was > 3 in 15 patients and < 2 in 12 patients. This insufficient control of the INR is one of the difficulties of the management of AF also found by several authors [4] [6] [7] posing acutely the problem of therapeutic education inherent in the use of this pharmacological class. DOACs which are then a beneficial alternative in several respects and validated [16] in patients with non-valvular AF have not been prescribed in our work. This lack of prescription of DOACs could be explained by their high cost for our patients, the majority of whom have a rather low socio-economic level.

5. Conclusion

Hypertension and rheumatic valve disease are the most common etiological factors of AF. The diagnosis was most often made at the stage of heart failure. Treatment with VKAs was the most prescribed. Improving patient access to VKAs treatment monitoring and DOACs prescribing will contribute to better management in our regions.

Conflicts of Interest

The authors do not declare any conflict of interest in relation to this work.

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