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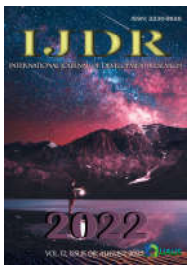

RESEARCH ARTICLE OPEN ACCESS

EPIDEMIOLOGICAL PROFILE OF ATRIAL FIBRILLATION PATIENTS IN A CARDIOLOGY CLINIC OF SÃO BENTO DO SUL (SANTA CATARINA– BRAZIL)

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ABSTRACT

Atrial fibrillation (AF) is a cardiac arrhythmia characterized by complete disorganization of the electrical activity and atrial contraction and also associated with the occurrence of cerebrovascular accident (CVA) due to thrombus formation. The present study characterized the epidemiological profile of AF patients in a private community cardiology clinic in São Bento do Sul (Santa Catarina state - Brazil). This is a retrospective study whose data were obtained from medical records for the organized preparation of the epidemiological and clinical profile of patients from 2007 to 2017. Among 102 patients, 54% were male, 84% were older than 60 years, white ethnicity was predominant (85%), one third had morbid obesity, and only 10% of patients practiced physical activity. Systemic arterial hypertension (SAH), diabetes, and dyslipidemias were present in 40%, 17%, and 17% of patients, respectively, while 25% were tobacco smokers, 10% had a history of rheumatic disease, and 3% were alcoholics. The main anticoagulant used for CVA prevention was warfarin (60.4%). Knowing the profile of cases, public health education can be promoted aimed to understand AF, its risk factors, and consequences, which, associated with clinical treatment and lifestyle changes, may contribute to mitigate modifiable risk factors, and reduce AF morbimortality.

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INTRODUCTION

Arrhythmia is defined as any rhythm that is not within normal heart rate values (Carneiro *et al*., 2012) Arrhythmias can be asymptomatic or severe enough to cause sudden death[1]. Atrial fibrillation (AF) is a cardiac arrhythmia characterized by the complete disorganization of the electrical activity of the atria (heart upper chambers) and the consequent incoordination of atrial contraction. AF is associated with the occurrence of CVA in patients with risk factors such as advanced age, cardiac hypertrophy, systemic arterial hypertension (SAH), diabetes[1], in addition to obstructive sleep apnea, obesity, consumption of alcoholic beverages, sedentary lifestyle, family history, and genetic factors may also contribute to the onset of AF (Magalhães *et al*., 2016). AF is classified according to its onset as: 1) paroxysmal, lasting up to 48 hours and with spontaneous reversal; 2) chronic persistent, which has not yet undergone any form of treatment; and 3) chronic permanent, that which is refractory to previous attempts of chemical or electrical reversal (Consolim-Colombo *et al*., 2019). Some AF causes originating in normal hearts include autonomic influences (vagal and sympathetic), alcohol intake, use of sympathomimetic or antihistaminic drugs, coffee consumption, smoking, and pulmonary embolism. AF secondary to cardiopathies is caused by: mitral stenosis and insufficiency, SAH (leads to left ventricular hypertrophy), coronary insufficiency (causes atrial ischemia and inferior infarction), post-operative heart surgery, myo- and pericarditis (Consolim-Colombo *et al*., 2019). According to the II Brazilian Guidelines on Atrial Fibrillation (Magalhães *et al*., 2016), there is a clear association between AF and the risk of ischemic (ICVA) or hemorrhagic (HCVA) stroke and mortality. Moreover, heart failure (HF) and AF coexist in a high percentage of patients (22 to 42%)[2] and the onset of AF in patients with HF is associated with a twofold increase in the risk of death compared with individuals without this problem (Magalhães *et al*., 2016). AF increases the risk of thrombus formation in the heart, which may detach and travel through the bloodstream, clogging vessels elsewhere, including in the brain, which can lead to CVA[2]. Thus, AF increases the risk of ICVA, so that at least one in five CVAs is caused by AF. Therefore, anticoagulant drugs are used in AF patients to prevent ICVA (Lorga Filho *et al*., 2013). Considering AF's prevalence, risk factors, and consequences, it is essential to think about strategies to minimize this

morbidity, which can be based on the knowledge of the cases' epidemiological profile, which was the objective of this study.

MATERIALS AND METHODS

This was an observational, descriptive, and retrospective study that analyzed the epidemiological characteristics of AF patients treated at a Cardiology Clinic in São Bento do Sul from 2007 to 2017. Inclusion criteria were: medical records of AF patients seen in the referred time frame, older than 18 years, regardless of gender, race, and education level. Medical records of patients with arrhythmias other than AF and of patients under 18 years of age or who did not present enough information in the medical record were not analyzed. Data collection was performed only after the project was approved by the Research Ethics Committee of the University of the Joinville Region (Opinion number 2,830,044 issued on 08/19/2018) and the data were extracted from secondary sources (medical records) of the patients seen by the cardiologists of the Cardiology Clinic and no information that would allow the identification of the subjects was collected. The collected data included gender, age, education level, race, physical activity habits, and the presence of risk factors for heart disease (body mass index, smoking, sedentary lifestyle, SAH, and alcoholism). Regarding the management instituted for AF, the following data were collected: anticoagulant treatment instituted, and its follow-up and causes involved in the development of AF. Data were entered into Excel® spreadsheets for more organized observation and are presented as descriptive statistics.

RESULTS

The medical records of 102 patients were analyzed. About their gender, it was observed a small but higher prevalence of AF among men: 54% of the analyzed population was male and 46% was female. Regarding the age range, it was found that 16% are between 40 and 59 years of age, 28% between 60 and 69, and 56% are over 70. Out of this 56%, 37.5% are over 80 years of age. Among the studied population, 85% considered themselves white, 11% black, and 4% brown. The most common level of education was complete elementary school (70%), followed by complete high school (28%), and only 2% with higher education. Only 11 patients practiced some physical activity at least 3 times a week for at least 30 minutes, and most of them were sedentary. Obesity (classes I, II or III) proved to be an important clinical condition in the study population: one third of the patients had such comorbidity. Additionally, SAH (40%), type 2 diabetes mellitus (17%), dyslipidemia (17%), chronic obstructive pulmonary disease (COPD) (11%), alcoholism (3%), neoplasia (3%), and hypothyroidism (3%) were also identified. Approximately 35% of the patients had more than one comorbidity and 23% of the group had no other clinical condition. Still, 10 patients with rheumatic diseases were found (7 were women). Just like the AF incidence in the general population, the risk of CVA in patients with this arrhythmia is directly linked to age (Gagliardi, Gagliardi, 2014).

In the present study, it was observed that 10.9% of the patients evaluated had at least one encephalic ischemic event during their lives, and in only one of them it occurred before the age of 60. Therefore, the Brazilian Guidelines on Antiplatelet Agents and Anticoagulants in Cardiology recommend the prophylaxis of these events with the routine use of anticoagulants. Among the patients in the sample who suffered ischemic events, 54.5% were taking warfarin, which may be linked to the presence of other comorbidities that predisposed such patients to it or to factors related to the adequate control of warfarin use, which is a medication that has a low safety margin and interacts with several other drugs and therefore, a coagulogram was required to monitor the patient's anticoagulation status by means of the international normalized ratio (INR) and diet control, alcohol consumption, and other drugs (Lorga Filho, 2013). Since 58.1% of the total sample was found to have irregular INR control, this may have contributed to the prevention failure. It was noted in this study that 19.8% of patients were using rivaroxaban, 10.8% dabigatran, 7.9% edoxaban, and only one patient was using apixaban (0.99%), and no patient presented ischemic event using these drugs. Until the end of data collection, success in secondary prevention was perceived, since no recurrence of CVA was recorded among the subjects using these drugs.

DISCUSSION

AF is the most frequent arrhythmia in clinical practice, and its prevalence in the general population has been estimated between 0.5 and 1% (Magalhães *et al*., 2016). American studies of people over 65 years of age show an increase in AF prevalence of 0.3% per year and an absolute growth of 4.5% from 1993 to 2007. However, it is likely that these numbers are underestimated, since many cases (10 to 25%) do not produce symptoms, which therefore limits the search for a specific diagnosis and consequent notification(Magalhães *et al*., 2016). Marcolino *et al*. (2015) conducted a retrospective study involving patients over five years of age, from primary care centers in 658 cities of Minas Gerais state, who underwent digital electrocardiograms in 2011, totaling just over 260 thousand subjects, with a mean age of 50.3 ± 19.3 years, of which 59.6% were female. The AF prevalence was found to be 2.4% in men and 1.3% in women, notably increasing after 60 years of age in both genders. The mean age of AF patients was 70 ± 13.5 years, and this occurred in 54.4% of male patients. According to Justo and Silva (2014), the AF incidence is directly related to age, affecting about 2% in individuals over 60 years of age. The Framingham study (started in 1948), which is already in the prospective follow-up of the third generation of subjects analyzed to follow the development of cardiovascular diseases, reaffirms the increasing AF incidence in older subjects. In addition to this North American study, studies conducted in Europe, America, Asia, and Oceania also observed a higher AF prevalence in older people, which was attributed to the higher prevalence of other cardiovascular conditions (Justo, Silva, 2014). Hence, the results of the present study regarding gender and age range were convergent with the literature.

It was verified that 85% of those researched considered themselves white, 11% black, and 4% brown. However, it was not possible to associate AF with race, since, according to the Brazilian Institute of Geography and Statistics - IBGE (2019), 80% of the population of Santa Catarina state is white. Investigation about the level of education of patients is important because higher level of study implies better knowledge of the pathology in question, its treatment and prevention, and access to health services, possibly leading to better care. However, a systematic review that investigated associations between socioeconomic factors and risk of AF in 12 studies found no relationship between socioeconomic status and risk of AF (Lunde *et al*., 2018). But according to Lunde *et al*. (2018), when the outcomes of the disease in different social classes were investigated, it was noted that complications were more frequent in the lower social classes. These findings may point to health intervention policies focused on the management of AF among patients of lower social classes, including in primary care. Only 10% of the study group used to practice some physical activity, a finding similar to that of Magalhães *et al*. (2016), who highlighted the absence of physical exercise as a risk factor for the development of AF. According to Nattel (2020), regular physical activity is protective against most cardiac arrhythmias, including AF, but when practiced at high intensity, it can promote the disease (especially in men) and this should be considered in highly active patients with arrhythmia. It is well known that hypertension is the most important modifiable risk factor for AF, and its therapeutic management is considered part of the global approach to AF. The systematic review by Verdecchia, Angeli, and Reboldi (2019) reaffirms the correlation between the two pathologies. First, a population-based case-control study evidenced that the risk of AF doubles in individuals with systolic BP ≥150 mm Hg compared with patients with values between 120- and 129-mm Hg. Second, a cohort of women from the Women's Health Study who were followed for 14 years observed that patients with BP in the range 130-139/85-89 mmHg had a 28 to 53% higher risk of AF than those with BP < 120/65 mmHg. Third, a Norwegian study in which

2014 healthy men were followed for 30 years starting in 1972-1975 found that the risk of AF was lower in individuals with BP < 128/80 mmHg than in those with higher measures (Verdecchia, Angeli, Reboldi, 2019). Therefore, the convergence of data from the present study with the literature is remarkable.

SAH was the main comorbidity found in the patients of this study. SAH causes increased pressures and volumes of the left atrium and activation of the renin-angiotensin-aldosterone system, leading to lesions in the heart, such as the phenomenon of atrial remodeling, which contributes to the triggering of AF (Justo, Silva, 2014). Proper pressure control can lead to reverse ventricular remodeling and, consequently, a decrease in the frequency of AF paroxysms. The goal is to achieve a systolic pressure between 120 and 130 mmHg. A reduction in cases of AF is observed in patients treated with ACE inhibitors and angiotensin receptor blockers compared to other classes of drugs such as beta blockers (Magalhães *et al*., 2016). Justo and Silva (2014) highlight acute myocardial infarction (AMI), aortocoronary bypass surgery, CHF, valvulopathy, and CVA as the most prevalent comorbidities in patients discharged from hospital with AF. Some findings of the present study are convergent: 9% of AF patients were also victims of CVA and 16% had valvulopathy, while only 1% of patients had a history of AMI or CHF. It is possible that these differences are due to the fact that Justo and Silva (2014) evaluated a population that was being discharged from hospital and the present study was concerned with the characteristics of patients being followed up in a private clinic; thus, it is possible that population differences of, for instance, income or education level or access to health services are responsible for these distinctions. In patients with AF secondary to heart diseases, 34% are exclusively caused by arterial hypertension, 7% by mitral valve disease, and only 2% by AMI. Another clinical condition that follows this line of congruence is diabetes. A case-control study by Dublin *et al*. (2010), conducted in the United States, with 1410 cases and 2203 controls, linked DM with AF in a possibly causal association. It was observed that diabetic patients, even with drug treatment, have a 40% higher risk of developing AF than healthy individuals. The risk was also found to be even higher in patients with poorer glycemic control and longer disease duration. Therefore, the authors suggest that physicians should always suspect AF in patients with DM and vice versa (Dublin *et al*., 2010). The physiopathology of this association is still unclear. It is known to involve oxidative stress, inflammation, formation of advanced glycosylation derivatives with induction of myocardial fibrosis and hypertrophy, and promotion of electroanatomic remodeling of the left atrium. Glycemic control with metformin demonstrated a protective role in the incidence of AF in a Taiwanese population over a 13-year period (Justo, Silva, 2016).

Cintra and Figueiredo (2021) suggest that dyslipidemia and AF have a still unclear relationship, presenting data from the MESA (2000-2002) (Kim *et al*., 2017) and Framingham (1995-1998) (Wolf, Abott, Kannel, 1991) studies, in which high HDL levels decrease the risk of AF and high triglyceride values promote the opposite. LDL cholesterol showed no correlation with AF in these studies. In contrast, Cintra and Figueiredo (2021) present another prospective population-based study, in which HDL, triglycerides and AF were not related, but low LDL levels were associated with a higher risk of AF. The finding that, in normal hearts, 13% of AF patients had the alcohol habit in this study may be correlated with the direct toxic action of ethanol on the myocardium and it also increases the risk of obesity, hypertension and sleep disorders (Justo, Silva, 2016). Roughly 25% of the patients in this study were smokers, another relevant agent for the development and follow-up of the disease, as evidenced by Justo and Silva (2016). Initially, studies correlating AF and smoking were discordant. Currently, a meta-analysis of 16 prospective studies by Zhu *et al* (2016) points to a higher prevalence of AF among smokers. Smoking is known to have a dose-dependent effect in relation to the risk of AF. The stimulant substances in cigarettes and the lung aggression caused by it are blamed for this association (Darrieux, Carvalho, Veronese, 2015). There is no evidence that smoking cessation prevents AF, but it is agreed that the reduction of atrial and lung damage decreases the probability of progression to AF. In addition, smoking cessation reduces the risk of developing the disease (Darrieux, Carvalho, Veronese, 2019). Rheumatic heart disease increases by 8 times the probability of AF in men, and by 27 times in women (Justo, Silva, 2016). In the present study, 90% of the subjects did not have rheumatic disease, and among the 10% with rheumatic disease, 70% were women. Hence, considering the number of subjects included, rheumatic conditions were not so significant regarding the presence of AF in the population studied, and only 5% of AF cases were found in which the valvulopathy was of rheumatic origin. Nearly 23% of the present study group did not have any comorbidity. According to Cintra and Figueiredo (2021), the epidemiology of "solitary AF" is uncertain. However, highlighting data from the Framingham study (1948) and comparing AF without comorbidities with typical AF, the authors noted that the risk of cardiovascular outcomes and mortality in the former are lower than in the latter (Cintra, Figueiredo, 2021).

Warfarin is the most widely studied and used anticoagulant in the prevention of CVA in patients with AF (Gagliardi, Gagliardi, 2014), agreeing with the findings of the present study, in which it was observed that 60.4% of patients were using warfarin since their diagnosis. However, according to the Brazilian Guidelines on Platelet Antiaggregants and Anticoagulants in Cardiology (Lorga Filho *et al*., 2013), for not requiring monitoring of anticoagulation by blood tests, presenting lower bleeding risk and fewer drug and food interactions, the new oral anticoagulants non-antagonists of vitamin K, such as thrombin blockers (dabigatran) or activated factor X (rivaroxaban, apixaban) entered the market in 2004 (Gagliardi, Gagliardi, 2014). Based on clinical trials with these medications, similar or slightly better efficacy was observed than warfarin with an improved safety and interaction profile (Giugliano *et al*., 2013). Araújo and Barbosa (2020) analyzed systematic reviews with or without meta-analysis (n = 4) and randomized clinical trials (n = 4) and economic evaluation studies (n = 2) comparing the new oral anticoagulants with warfarin for prevention of thromboembolic events, intracranial hemorrhage and major bleeding in patients with non-valvular AF previously anticoagulated with warfarin. However, despite verifying that economic studies suggest that, in most international contexts, the new drugs are cost-effective in patients never anticoagulated as first line therapy, the question remains about the advantage of migrating from warfarin to apixaban or dabigatran in terms of cost-effectiveness regarding the Brazilian Public Health System (BPHS) context. Therefore, studies involving the Brazilian population in order to clarify the cost-benefit ratio between the supply of rivaroxaban by the BPHS compared to the expenses linked to CVA recurrences due to questionable adherence of patients to warfarin use or to the performing of monitoring coagulograms, or because of complications linked to drug interactions for which warfarin is largely a better candidate, are essential to consider the possible inclusion of new oral anticoagulants in the list of drugs supplied by SUS.

CONCLUSION

AF is progressively more prevalent. Therefore, in the current scenario of increased life expectancy, it is of great interest to observe the epidemiological characteristics of each region. The present study pointed to this information in a private cardiology clinic in the city of São Bento do Sul and, among the AF patients, we noticed a higher prevalence of the disease among elderly and white men, and with SAH, diabetes, and dyslipidemias as the most frequent comorbidities, besides a significant rate of sedentary lifestyle and smoking as risk factors. Public health education towards this population, aiming to understand AF, its risk factors and consequences associated with clinical treatment and lifestyle changes that contribute to the mitigation of modifiable risk factors are essential for the reduction of morbidity and mortality from AF.

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