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Original Article

Investigation of the frequency of causes of atrial fibrillation in hospitalized patients diagnosed with AF in the heart department of Taleghani Hospital in Urmia

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Abstract

***Background & Aims*:** Atrial fibrillation (AF) is one of the most common cardiac arrhythmias and is classified as tachyarrhythmias. The purpose is to establish a correct and accurate patient diagnosis based on priorities and control, and to give importance to the timely and complete treatment of the disease, as well as the control and treatment of AF and related diseases as a leading factor in preventing heart failure.

***Materials & Methods*:** In this cross-sectional descriptive study, 300 patients diagnosed with AF and hospitalized in the cardiac department of Taleghani Hospital between 2003 and 2004 were included. Ultimately, the collected data were analyzed using SPSS version 12 software.

***Results*:** The average age of the patients in this study was 62.66 ± 11.2 years. Of the 300 AF patients studied, 162 (54%) were female and 138 (46%) were male. Among the patients, 95 (31%) had heart failure, of whom 31 (32.63%) had HTN, 27 (28.42%) had IHD, 9 (9.47%) had VHD, 4 (4.21%) had CMP, 2 (2.1%) had COPD, and 1 (1.05%) had thyrotoxicosis.

***Conclusion*:** According to this study's findings, several areas should be considered for these patients, including diagnosis, disease control, identifying the background of the disease, preventing complications, and ensuring regular follow-up.

***Keywords*:** Atrial fibrillation, Cardiac arrhythmias, Hospital

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Introduction

Atrial fibrillation (AF) is a common, non-infectious chronic disease (1) that affects many people with cardiovascular diseases, and about 1% of the world's general population suffers from it (2). AF is the most common cardiac arrhythmia in which the electrical impulse does not follow a specific path. It occurs when an electrical wave is not present directly in the atria and is described as a supraventricular tachyarrhythmia associated with uncoordinated atrial activity and

subsequent mechanical atrial failure (3). The stages of AF are based on the duration of the arrhythmia and are classified into three stages: attack, stable, and permanent. In the attack stage, the period of arrhythmia is more than 30 seconds but less than a week. If the arrhythmia lasts for more than 7 days but less than a year, the disease progresses to the stable stage. Finally, if the arrhythmia lasts for more than 1 year, the disease enters the permanent stage (4). This disease reduces the heart's ventricle capacity and output volume, impairing ventricular activity. Additionally, AF may lead to the formation of blood clots and vessel blockage, increasing the risk of stroke and death in these patients (5).

AF affects 21 million men and 13 million women, according to 2010 data, with a significantly higher prevalence in developed countries (6, 7). Based on current evidence, approximately one-third of patients hospitalized for cardiac arrhythmia are due to AF, and this proportion has risen to 66% over the past 20 years. This increase can be attributed to the aging population, the rising prevalence of chronic heart disease, and the increase in diagnostic cases due to advances in diagnostic technologies (8). This trend has characterized AF as a global epidemic in the 21st century (6, 9-11). Despite considerable efforts to prevent AF and its associated complications, it remains a significant challenge and concern for health officials (12). The incidence and prevalence of AF are on the rise worldwide. Data from the Framingham Heart Study (FHS) indicate that the prevalence of AF has tripled over the past 50 years (9). The Global Burden of Disease Project estimated the worldwide prevalence of AF to be approximately 46.3 million people in 2016 (13). In 2004, the lifetime risk of AF was estimated to be about one in four for white men and women over 40 years of age (14), whereas a decade later, the lifetime risk estimates for AF were about one in three for white men and one in five for Black people (15). In the United States alone, at least 3 to 6 million people have AF, a number that is projected to increase to about 6 to 16 million by 2050 (16, 17) and to about 14 million by 2060 (16, 17). It is also estimated that by 2050, AF will be diagnosed in at least 72 million people in Asia, with 3 million of them experiencing AF-related strokes (18).

Currently, AF affects approximately 60 million adults worldwide, leading to increased cardiovascular mortality rates and imposing social, psychological, and financial burdens on patients and their families (19). In Iran, preliminary data indicate that the prevalence of AF in the adult population (over 50 years) in primary healthcare settings is approximately 2.8%, which is almost similar to the prevalence of AF in the general population of developed countries at 2% (20).

AF has a wide range of clinical manifestations. People suffering from this disease commonly experience heart palpitations, shortness of breath, fatigue, weakness and lethargy, lightheadedness, and chest pain (21). Awareness and advanced diagnosis of AF have improved over the past decade, and estimating the prevalence of AF based on symptomatic presentation is challenging, as approximately one-third of the total AF population is asymptomatic. This progress in diagnosis is significant (22, 23).

Age is the most important risk factor for AF, and the incidence of AF increases with age, rising to 1% in people over 60 years old and to 5-9% in those over 69 years old (24, 25). In addition to age, other risk factors for AF include body mass index, alcohol, aortic insufficiency and stenosis, atrial wall defects, autonomic dysfunction, heart or chest surgery, cardiomyopathy, chronic lung disease, cocaine, congenital heart disease, coronary artery disease (CAD), congestive heart failure (CHF), diabetes mellitus, drugs (especially sympathomimetics), emotional stress, excessive coffee consumption, hypertension (HTN), hyperthyroidism, hypoglycemia, hypocalcemia, hypovolemia, hypoxia, left atrial enlargement, left ventricular dysfunction, left ventricular hypertrophy, male gender, mitral stenosis and mitral regurgitation, myocardial infarction (MI), myocarditis, neoplastic disease, obesity, pericarditis, pneumonia, pulmonary embolism, rheumatic heart disease, Wolff-Parkinson-White syndrome, sick sinus syndrome, smoking, and genetic predisposition, all of which are proven risk factors for the development and

persistence of AF (26-28). Psychosocial factors and lifestyle, especially at younger ages, are also important modifiers of AF occurrence (29).

Considering the importance of predisposing factors for AF in the identification, control, follow-up, and treatment of patients with this disease, we conducted this study to investigate and identify the frequency and significance of various causes of AF in patients admitted to the Heart Center of Taleghani Hospital in Urmia.

Materials & Methods

This cross-sectional descriptive study was conducted over 6 months, from November 2003 to the end of May 2004. Following approval by the research committee of Urmia University of Medical Sciences and the necessary coordination with the management of Taleghani Hospital, including its heart center, the researcher visited the hospital to identify all patients hospitalized with AF during the specified period. The desired information was collected using a special form based on the study variables. To gather the information, the researcher referred to the heart center of Taleghani Hospital in Urmia and its various departments, including the male CCU, female CCU, men's heart ward, and women's heart ward. Patients with AF were identified, and after taking a history, conducting an examination, and reviewing an ECG (based on the criteria mentioned for AF), the diagnosis of AF was confirmed. Basic information for each patient was recorded on special forms (for each patient, a special form including individual details, age, sex, cause, or underlying causes proposed for AF was used). Based on examinations and patient histories, necessary measures were taken to request required tests and paraclinical procedures (such as thyroid tests, spirometry, echocardiography, etc.). After completing each case, the special form was filled out during subsequent visits so that after the end of the project, the information in the special forms could be analyzed, and statistical results obtained.

Statistical Analysis

After collecting all the information related to the patients from a special form and entering all the data into the computer using SPSS software, the collected data were descriptively analyzed, and the percentage and frequency of the studied variables were reported.

Ethical Issues

Throughout the entire research process, patients' names were not mentioned at any stage, and information about the patients remained completely confidential.

Results

In this study, 347 patients with AF were examined, of whom 47 were excluded for various reasons. Twenty-three patients were excluded due to a strong suspicion of hyperthyroidism (based on examination and history), refusal to undergo thyroid tests, or failure to provide thyroid test results (seven patients refused due to the high cost of the tests, and 16 were discharged before the thyroid test results were available and failed to provide the results). Three cases were excluded before the complete diagnostic procedures were completed. Additionally, nine individuals with clinical suspicion of chronic obstructive pulmonary disease (COPD) and incomplete information and paraclinical results (failure to perform spirometry), two people due to a history of suspected acute alcohol consumption, eight people due to early discharge before the echocardiography results were determined, and two individuals due to clinical suspicion of pulmonary embolism and failure to perform a lung perfusion scan were excluded from the study. Ultimately, 300 AF patients remained in the study, with their information fully completed.

Among all AF cases examined (300 cases), 162 patients (54%) were women and 138 patients (46%) were men. The majority of AF cases in the studied population were in the age group of 61-70 years (33%), followed by the age group of 71-80 years (26%) and the age group of 51-60 years (22%). In total, 256 cases (85%) were in the age group of 50 years and above, with an average age of 62.66 among the studied patients. It should be noted that, as this study was

conducted at an adult heart center (Taleghani Hospital, Urmia), the disease was not studied in the age group of 0-10 years, which is mostly related to pediatric cardiology. Additionally, the frequency of the age group of 90-100 years was zero.

Table 1. Frequency and percentage of underlying causes of atrial fibrillation by gender

Causes	Frequency (%) in men	Frequency (%) in women	Frequency (%) in total
HTN	41 (38.67)	65 (61.32)	106 (35.33)
IHD	48 (57.83)	35 (42.16)	83 (27.66)
VHD	13 (40.62)	19 (59.37)	32 (10.66)
CMP	10 (47.61)	11 (52.38)	21 (7)
COPD	3 (75)	1 (25)	4 (1.33)
Pericarditis	2 (66.66)	1 (33.33)	3 (1)
Thyrotoxicosis	0	3 (100)	3 (1)
WPW	1 (100)	0	1 (0.33)
SSS	0	0	0
PE	0	0	0
Alcohol	0	0	0
LONE AF	3 (33.33)	6 (66.66)	9 (3)
IHD + HTN	9 (40.9)	13 (50.09)	22 (1.33)
COPD + HTN	3 (60)	2 (40)	5 (1.66)
COPD + IHD	3(100)	0	3 (1)
COPD + CMP	1 (100)	0	1 (0.33)
VHD + CMP	1 (50)	1 (50)	2 (0.66)
Thyrotoxicosis + HTN	1 (20)	4 (80)	5 (1.66)

According to Table 1, the most frequent causes of AF in the studied population were related to HTN, with 106 cases (35.33%), ischemic heart diseases (IHD) with 83 cases (27.66%), and VHD, with 32 cases (10.66%). Additionally, WPW and COPD + CMP, each with only one case (0.33%), and VHD + CMP with 2 cases (0.66%), had the lowest frequency of AF causes. It should be noted that in this study, out of 300 cases of AF patients examined, SSS, acute alcohol use, and pulmonary embolism were not identified as causes of AF in any case. In other words, the frequency of these causes in the study population was zero. Also, in 9 cases (3%) of the studied population, no specific underlying cause was found for AF.

Among the causes of AF, the most common were HTN + thyrotoxicosis with 4 people (80%), HTN with 65 people (61.32%), VHD with 19 people (59.37%), CMP with 11 people (52.38%), and IHD + HTN, which were common among women with 13 people (50.09%); all cases of thyrotoxicosis were among women with 3 people (100%). Additionally, the majority of COPD cases, with 3 people (75%), pericarditis with 2 people (66.66%), COPD + HTN with 3 people (60%), and IHD with 48 people (57.83%) were common among men. All cases of COPD + IHD with 3 people (100%), COPD + CMP with 1 person (100%), and WPW with 1 person (100%) were also among men. It should be noted that the total ratio of female patients (162 people) to male patients (138 people) was approximately 1.2.

Table 2. Frequency and percentage of CHF cases according to causes of AF

Causes	Frequency (%) in men
HTN	31 (32.63)
IHD	27 (28.42)
VHD	9 (9.47)
CMP	4 (4.21)
COPD	2 (2.1)
Thyrotoxicosis	1 (1.05)
IHD + HTN	12 (12.63)
COPD + HTN	3 (3.15)
COPD + IHD	2 (2.1)
COPD + CMP	1 (1.05)
VHD + CMP	2 (2.1)
Thyrotoxicosis + HTN	1 (1.05)

According to Table 2, out of all 300 patients studied, 95 (31%) had heart failure, and 205 (69%) did not have heart failure. Among the 95 people who had heart failure, the most common causes related to AF were HTN, with 31 people (32.63%), IHD with 27 people (28.42%), and valvular heart diseases (VHD), with 9 people (9.47%). The least common causes related to AF were thyrotoxicosis, HTN + thyrotoxicosis, and COPD + CMP, each of which had only 1 person (1.05%).

Discussion

In the present study, which aimed to investigate the frequency of causes of AF in hospitalized patients diagnosed with AF in the Heart Center of Taleghani Hospital in Urmia, the results showed that most cases of AF were in the age group of 61-70 (33%). The average age of the patients was 62.66 years. Age is the most critical risk factor for AF, and the incidence of AF increases with age, reaching 1% in people over 60 years old and 5-9% over 69 years old (24, 25). The age distribution in our study was broadly similar to that in other Middle Eastern countries; however, Iranian AF patients are at least a decade younger than AF patients in Western countries (30). This is because the average age for AF patients in most Western studies is between 70 and 80 years (31-34).

Furthermore, the results of this study showed that the frequency of AF cases in women is higher than in men, with an approximate ratio of 1.2. This was consistent with the study by Wańkowicz et al. (35). Although most published studies have reported a higher incidence of AF in men than in women, and the overall ratio is about 60% (6, 36-38), recent studies have shown that women experience more AF-related symptoms than men (39). The prevalence of AF in women 75 years and older is almost twice that of men (40).

The results of this study determined that the most frequent causes of AF in the studied population were related to HTN, with 106 cases (35.33%), IHD, with 83 cases (27.66%); and VHD, with 32 cases (10.66%). In this sense, it was consistent with other studies, as high blood pressure (HTN) is the most common risk factor for AF in the Iranian population (36, 41, 42). In general, HTN is recognized as the main and most common risk factor for death and disability from non-communicable diseases worldwide, and it has been identified as one of the main risk factors for AF by many researchers (43, 44).

A meta-analysis study published between 2004 and 2018 showed that the prevalence of HTN has increased in Iran (45). The national survey of risk factors for non-communicable diseases in Iran showed that 25% of

Iranians aged 25 to 64 have HTN, and another 46% in the same age range have pre-hypertension. Among the patients with HTN, 34% were aware of their blood pressure, 25% received antihypertensive drugs, and 24% of the treated people had adequately controlled their blood pressure (46). Also, in general, drug adherence to antihypertensives in Iran is low (33%) (47). All these factors may increase cardiovascular complications, including AF, in the Iranian population. Additionally, VHD and IHD are still considered important causes of AF worldwide (41, 48).

According to the results of this study, 95 (31%) of the 300 patients examined had heart failure, and 205 (69%) did not have heart failure. Among the 95 people who had heart failure, the most common causes related to AF were HTN, with 31 people (32.63%), IHD with 27 people (28.42%), and VHD with 9 people (9.47%). As mentioned in this study, the most common causes of AF are related to heart diseases, with HTN being more common than other conditions. Among non-cardiac diseases, COPD and thyrotoxicosis were more common than other diseases, though their frequency was lower. In other studies, non-cardiac diseases also play an essential role in causing AF.

COPD is independently associated with AF, and studies have shown that patients with COPD are 4.41 times more at risk of developing AF, and COPD is present in 10-15% of patients with AF (49, 50).

Additionally, diabetes mellitus, obesity, smoking, and a family history of AF are the main non-cardiac conditions associated with AF. Unfortunately, the alarming increase in diabetes and obesity in the Iranian population is largely due to an obesity epidemic (51). There is a relatively high frequency of chronic cardiovascular complications among diabetic patients (52). Population-based studies have shown that the lifetime prevalence of smoking among Iranian adults is relatively high (53). On the other hand, the risk of AF increases with increasing years of smoking (54).

One of the limitations of this study is the short period (6 months), which is the reason for the lack of data. Additionally, the study was carried out in only one hospital and was limited in terms of location, potentially impacting the comprehensiveness of the study results. Furthermore, we can mention the small number of variables in the checklist or special form used to gather information from patients because it was possible to have more demographic variables to cover all common non-cardiac causes of AF, in addition to cardiac causes.

Suggestions

Based on the results obtained and the importance of each, it is necessary to conduct thorough research and implement appropriate health and treatment measures. Some suggestions are given below:

First, accurate, comprehensive, and timely diagnosis of HTN as a common, complicated, and hazardous disease, and controlling this disease as an underlying factor in the occurrence of AF. Additionally, IHD and VHD should be given importance, and screening programs should be implemented at the age of 50-60 at the community level. Moreover, special attention should be given to controlling and preventing non-cardiac diseases, such as diabetes, obesity, chronic lung disease, and smoking, which are common causes of AF.

Conclusion

According to the results of this study, it was determined that HTN plays a very important role in the development of AF and is one of its primary causes. The prevention and control of HTN should be the priority of health system programs. In addition to HTN, IHD and VHD are the main causes of AF.

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Author's Contributions

R.M. and K.K. designed the study, analyzed the data, and wrote the initial draft of the study. R.M., K.K., and Z.Y participated in data analysis and drafting of the initial draft of the study. A.R. designed the study, searched databases, screened studies, extracted

and analyzed data, wrote the first draft of the study, and acted as supervisor. All authors reviewed the manuscript.

Data Availability

All data generated or analyzed during this study are included in this published article.

Conflict of Interest

The authors declare no conflict of interest

Ethical Statement

All members of the research team adhere to research and publication ethics and follow the guidelines and ethical standards published by the journal.

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