

THE PREVALENCE OF ATRIAL FIBRILLATION CAUSES; A CROSS-SECTIONAL SURVEY AT A LARGE TEACHING HOSPITAL

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Abstract: The most frequent cause of atrial fibrillation is abnormalities or damage to the heart's anatomy. Previous observations suggest that the prevalence of atrial fibrillation may be understated in high-income countries compared to low- and middle-income nations. Conversely, other findings indicate that the prevalence of atrial fibrillation in developed countries may be overstated compared to third-world countries. **Objective:** To determine the frequency of causes of atrial fibrillation in a tertiary care hospital and to evaluate the prevalence of atrial fibrillation etiology in this setting. **Methods:** This cross-sectional survey, conducted with a rigorous methodology, was carried out in the Department of Cardiology at Gulab Devi Hospital, Lahore, Pakistan, over six months, from December 18, 2018, to June 18, 2019. After receiving clearance from the hospital ethics committee, 250 patients diagnosed with atrial fibrillation and meeting the inclusion criteria were enrolled in the study. Written consent was obtained from all participants, and their demographics were recorded. Patients underwent ECG, ECHO, and other clinical assessment tests to evaluate the various causes of atrial fibrillation. Detailed histories of potential etiological factors were recorded using a structured proforma. Data were analyzed using appropriate statistical methods. **Results:** The mean age of the patients was 35.03 ± 12.29 years. Among the studied causes of atrial fibrillation, the prevalence of coronary kidney disease, diabetes mellitus, and hypertension were notably high, at 66%, 52.4%, and 41.4%, respectively. Other significant causes included coronary artery disease (12.4%), presyncope (13.2%), obesity (18%), and valvular disease (21.6%). **Conclusion:** The findings of this study revealed that the most prevalent causes of atrial fibrillation among the study population were coronary kidney disease, diabetes mellitus, and hypertension. Other significant etiological factors included coronary artery disease, presyncope, obesity, and valvular disease. These results highlight the need for targeted management strategies for atrial fibrillation in tertiary care settings.

Keywords: Atrial Fibrillation, Coronary Artery Disease, Diabetes Mellitus, Hypertension, Obesity, Presyncope, Valvular Disease

Introduction

Due to extensive population aging, especially in quickly emerging nations like Brazil, China, India, and Indonesia, Atrial fibrillation is a global health problem across the world. Although epidemiological data concerning the incidence of atrial fibrillation is widely available in North America and Western Europe. There is limited comparable data on atrial fibrillation in Africa, Asia, and South America. According to previous observations, the prevalence of atrial fibrillation may also be understated in developed countries when compared to 3rd world nations. Future research is necessary to offer accurate estimates of the worldwide problem of atrial fibrillation, identify crucial risk factors in diverse global locations, and account for regional and ethnic variations in atrial fibrillation.(1)

Atrial fibrillation has affected 2.2 million Americans and is the most frequent dysrhythmia. For men and women over 40, the lifetime risk for atrial fibrillation is about 25%, meaning that 1 in 4 older people will have atrial fibrillation before they pass away. We might suffer in the coming decades as a result of the notable achievements in other medical fields concerning atrial fibrillation.(2) Increases in longevity, better outcomes following myocardial infarction and congestive heart failure, and an increase in the frequency of cardiac surgery would undoubtedly result in an increase in the prevalence of atrial fibrillation because it is

primarily a disease of older individuals. According to current projections, 4 million people will have atrial fibrillation by 2030, and 5.6 million people will have it by 2050.(3)

Given the significant mortality and morbidity linked to atrial fibrillation, these figures are alarming. Over 70,000 deaths were primarily caused by or contributed to by atrial fibrillation in 2001. Between 1980 and 1998, the mortality rate (per 100,000) increased significantly, from 27.6 to 69.8. According to the Framingham Heart Study, having atrial fibrillation is independently linked to an increase in mortality risk of 50% to 90%.(4)

In addition to the higher mortality rates linked to atrial fibrillation, the morbidity linked to atrial fibrillation demands special consideration. The risk of ischemic stroke, the main cause of disability in the US, is five times higher in people with atrial fibrillation. In America, atrial fibrillation accounts for 15% to 20% of all strokes, or around 75,000 strokes each year. Atrial fibrillation is an independent predictor of stroke recurrence and stroke severity, with an increased risk for ischemic stroke and embolism in persons with a history of past stroke or transient ischemic attack (TIA; RR = 2.5). Finally, even in the absence of a problem, individuals with symptomatic atrial fibrillation have a reduced functional level and a lower quality of life. The mentioned issues have a substantial

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influence on the life of atrial fibrillation patients: exercise intolerance, palpitations, weariness, increased urination, congestive heart failure, angina, hypotension, and presyncope. (5)

The rationale of this study is to evaluate the frequency of reasons for the onset of atrial fibrillation in patients presenting in a tertiary care setup. Due to the absence of any concrete study on the above-mentioned topic, a need was felt and this study was planned. Only three studies have been conducted so far that have solely tried to find out the factors for atrial fibrillation. This study will add to those studies and help to make the awareness plan for the reason to be eradicated from society. Thus the objective of the study is to determine the frequency of causes of atrial fibrillation in a tertiary care hospital.

Methodology

This cross-sectional survey was conducted in the Department of Cardiology at Ghulab Devi Chest Hospital, Lahore, from December 18, 2018, to June 18, 2019. The sample size, calculated with a 95% confidence level and a 2.9% margin of error, included 250 cases based on an expected prevalence of presyncope as 5.8% in the context of atrial fibrillation. A non-probability, consecutive sampling technique was employed. The inclusion criteria consisted of patients aged 20 to 60 years, of both genders, diagnosed with atrial fibrillation, defined as an electrocardiographically verified irregular heart rhythm with erratic electrical signals in the atria, detectable via a 12-lead conventional electrocardiogram or 24-hour Holter monitoring. Exclusion criteria included patients with a history of stroke, previous percutaneous coronary intervention, or prior valvular procedures.

After receiving clearance from the hospital ethics committee, 250 patients meeting the inclusion criteria were enrolled. Written consent was obtained from all participants, and demographic data were collected. Patients underwent ECG, ECHO, and other clinical assessments to evaluate the various causes of atrial fibrillation. Detailed histories were taken to investigate potential etiologies, including presyncope, hypertension, coronary artery disease, diabetes mellitus, chronic kidney disease (CKD), obesity, valvular disease, left ventricular dysfunction, and lung disease.

Presyncope was identified by lightheadedness, muscular weakness, blurred vision, and a sensation of faintness. Hypertension was diagnosed if the patient had a blood

pressure reading greater than 140/90 mmHg at presentation or reported taking antihypertensive medication. Coronary artery disease was confirmed by ECG changes, echocardiographic findings, or a history of angioplasty or coronary artery bypass graft (CABG). Diabetes mellitus was diagnosed if the patient had a fasting blood sugar level over 126 mg/dl, an HbA1c level above 6.5%, or was on hypoglycemic medication. CKD was considered positive if the patient had a serum creatinine level greater than 3 mg/dl or ultrasound findings indicative of CKD. Obesity was defined by a body mass index (BMI) over 30, calculated using the formula: $BMI = \text{weight (kg)} / \text{height (m)}^2$. The valvular disease was diagnosed based on abnormal valve anatomy or blood flow detected by echocardiography. Left ventricular dysfunction was assessed using echocardiography, and lung disease was considered present if the patient had a persistent cough and chest X-ray changes.

Data were analyzed using SPSS version 26, with all causes presented as frequencies and percentages. This comprehensive methodology allowed for a thorough evaluation of the study population's various causes of atrial fibrillation.

Results

Age distribution of the patients was done; mean age was calculated as 35.03+12.29. Gender distribution of the patients was done; 144 (57.6%) were males and 106 (42.4%) were females. Presyncope distribution shows that out of 250 patients, 33 (13.2%) had it, and 217 (86.8%) had no signs of presyncope. Of 250 patients, 33 showed Presyncope, while 217 showed no signs of it.

Hypertension distribution Shows that out of 250 patients, 116 (46.4%) had Hypertension, and 134 (53.6%) had no hypertension. Coronary artery disease distribution shows that out of 250 patients, 31 (12.4%) had CAD, and 219 (87.6%) had no CAD. Diabetes mellitus distribution shows that out of 250 patients, 131 (52.4%) had DM, and 119 (47.6%) had no DM. CKD distribution shows that out of 250 patients, 165 (66%) had CKD, and 85 (34%) had no. Obesity distribution shows that out of 250 patients, 45 (18%) had obesity, and 205 (82%) had no obesity. Valvular disease distribution shows that out of 250 patients, 54 (21.6%) had valvular disease, and 196 (78.4%) had no valvular disease. (Table, Figure 1)

Table 1: Baseline characteristics of patients and causes of atrial fibrillation

Variables	Mean ± SD, F (%)
n	250
Age (years)	35.03 ± 12.29
Gender	
Male	144 (57.6%)
Female	106 (42.4%)
Presyncope	
Yes	33 (13.2%)
No	217 (86.8%)
Hypertension	
Yes	116 (46.4%)
No	134 (53.6%)
Coronary artery disease	
Yes	31 (12.4%)

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No	219 (87.6%)
Diabetes mellitus	
Yes	131 (52.4%)
No	119 (47.6%)
Chronic kidney disease	
Yes	165 (66.0%)
No	85 (34.0%)
Obesity	
Yes	45 (18.0%)
No	205 (82.0%)
Valvular disease	
Yes	54 (21.6%)
No	196 (78.4%)

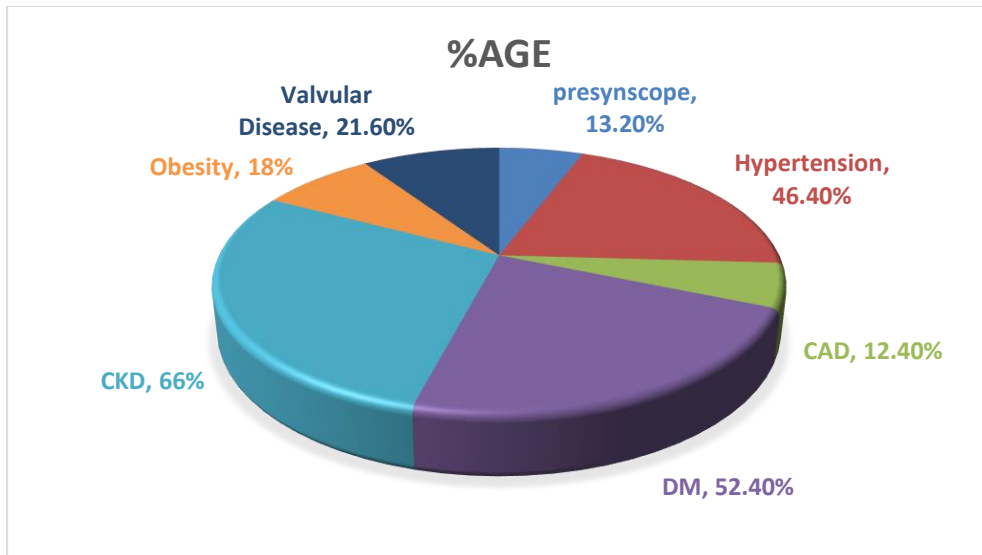


Figure 1: Comorbid condition in the study population

Discussion

The most frequent dangerous irregular heart rhythm is atrial fibrillation. As of 2014, it affects roughly 2–3% of people in Europe and North America.(6) Due to extensive population aging, especially in quickly emerging nations like Brazil, China, India, and Indonesia, atrial fibrillation is a significant public health burden worldwide.(1)

In our study, 250 patients were included, and the mean age was 35.034+12.293; 144 (57.6%) were males, and 106(42.4%) were females.

This study is based on the prevalent causes of atrial fibrillation. These include presyncope, hypertension, coronary artery disease, diabetes mellitus, coronary kidney disease, obesity, and valvular disease. Due to a significant increase in overall survival, atrial fibrillation prevalence is becoming dramatically high, and it is currently the most common cardiac sustained arrhythmia.

It was found in this study that one of the most common causes of atrial fibrillation is diabetes mellitus; the prevalence of DM was 52.4% in this study, which is significant. Data from the Framingham Heart Study revealed that risk factors for cardiovascular disease can predispose to atrial fibrillation in addition to intrinsic cardiac reasons such as valve dysfunction and congestive heart failure. After multivariable adjustment, DM was associated with odds ratios of 1.4 for men and 1.6 for

women for developing atrial fibrillation. Atrial flutter occurred in 4% of DM patients compared to 2.5% of the control group in the same study. In comparison, the incidence of atrial fibrillation in patients with DM 1s was reported to be 14.9% (P 0.0001).(7, 8)

In a study, it was noted that Pre-syncope was present in 27 (5.8%) of patients, hypertension in 85 (36.6%), coronary artery disease in 31 (13.8%), diabetes mellitus in 21 (8.9%), and CKD in 327 (71%) were found present in the cases that had been presented with atrial fibrillation.(9) While in another study, hypertension was the reason for atrial fibrillation in 14% of cases and 80%.(10, 11) A recent retrospective study showed that COPD was associated with atrial fibrillation in (23.3%).(12) Cardiomyopathy was found in 20% of cases of atrial fibrillation. The prevalence of atrial fibrillation in LVD was 65%.(13, 14)

We reported obesity to be present in 18 % of cases reported as a cause of atrial fibrillation in 8 % of cases by another study. (15) In a recent study, obesity was present in 12% of patients, valvular disease in 7.8%, diabetes mellitus in 2%, and hypertension in 4.6% of cases with atrial fibrillation. (16) Ninety-one patients (7.6%) caused valvular disease, and 23.1% mitral valve disease was noted in 102 (72%) patients who were identified with atrial fibrillation. (7, 17, 18) One hundred thirty-one patients (33.7%) had aortic valvular disease, and 4.7% of cases had aortic stenosis.(19)

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The prevalence of obesity in this study was 18%. In comparison to populations of similar weight, overweight populations had more excellent rates of atrial fibrillation incidence, prevalence, severity, and progression.(20)

Coronary kidney disease and hypertension are other significant causes of atrial fibrillation; in this study, the prevalence of CKD was 66%, and hypertension was 41.4%. Another study indicates that a critical contributor to atrial fibrillation is hypertension. More than 80% of people with atrial fibrillation have hypertension. In the CHADS₂, hypertension was found in 74% of patients with congestive heart failure and in 77% of patients who had their first stroke. Hypertension is one of the risk factors for the development of thromboembolic stroke in patients with atrial fibrillation.(21, 22)

It was found in this study that the prevalence of Presyncope, coronary artery disease, and valvular disease was 13.2%, 12.4%, and 21.6% in patients with atrial fibrillation, respectively. Another study showed that Coronary artery disease (CAD) is the most common cardiovascular disease, while atrial fibrillation is the most common cardiac arrhythmia. Both diseases share associated risk factors - hypertension, diabetes mellitus, sleep apnea, obesity, and smoking.

The prevalence of CAD in patients with atrial fibrillation is from 17% to 46.5%, while the prevalence of atrial fibrillation among patients with CAD is low, and it is estimated from 0.2% to 5%.(23)

Conclusion

In conclusion, the findings of the present study showed that among the studied causes of atrial fibrillation, the prevalence of coronary kidney disease, diabetes mellitus, and hypertension was a high percentage, but the other causes were coronary artery disease, Presyncope, obesity, and valvular disease were in a low rate. So, according to this study, there is a high need to control coronary kidney disease, diabetes mellitus, and hypertension to prevent atrial fibrillation.

Declarations

Data Availability statement

All data generated or analyzed during the study are included in the manuscript.

Ethics approval and consent to participate.

Approved by the department concerned. (IRB-GDHLP_837 dated 9-7-22)

Consent for publication

Approved

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Conflict of interest

The authors declared an absence of conflict of interest.

Authors Contribution

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Drafting & Concept & Design of Study

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