

Epidemiological Study of Atrial Fibrillation

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ABSTRACT

Background: The pathophysiology of AF is complex and multifactorial, involving ageing and a structural remodeling whereby apoptosis, inflammation and fibrosis are the hallmarks. Systemic inflammation is a strong predictor of atrial fibrillation. A key role for electrical remodeling is increasingly recognized, and experimental data suggest that inflammatory cytokines can directly affect connexins resulting in gap junction dysfunction.

Objective: This study aimed to study epidemiology findings of paroxysmal atrial fibrillation.

Patients and Methods: This case-control study was conducted on thirty-eight participants (19 males and 19 females). The included patients were recruited from Cardiology Department, Zagazig University Hospitals and Nasser Institute for Research and Treatment.

Results: Regarding baseline characteristics, it was reported that mean age of AF group was 61.2 ± 9.1 years and control group was 58 ± 12 years with no statistical significant difference between the two studied groups. Most of AF patients were smokers and had hypertension. There were no statistical significant differences between the studied groups regarding hypertension, smoking status, sex and age. Regarding clinical presentation, it was observed that palpitation was more in AF group than in control group (78.9% and 10.6% respectively). Chest pain was more presented in AF group than in control group (36.8% vs 26.3% respectively), while dyspnea was more presented in AF group than in control group (47.4% vs 26.3% respectively).

Conclusion: Mean age of AF group and control group was high. Most of AF patients were smokers and had hypertension. Palpitation occurred in about three fourths of AF patients' group.

Keywords: Epidemiology, ECG findings, Paroxysmal atrial fibrillation.

INTRODUCTION

Atrial fibrillation (AF) is the most common arrhythmia, at least 2.3 million individuals suffer from AF in the US alone. The etiology of AF is not completely understood. Many factors such as neuro-endocrine function, acute or chronic hemodynamics and metabolism may cause atrial remodeling and thus play a role in the initiation and progression of AF⁽¹⁾.

Paroxysmal atrial fibrillation occurs when a rapid, erratic heart rate begins suddenly and then terminates spontaneously or with intervention within 7 days. It is also known as intermittent A-fib and often lasts for less than 24 hours⁽²⁾.

The American Heart Association (AHA) estimate that 2.7 million American people live with some form of A-fib. The likelihood of experiencing paroxysmal A-fib increases with age⁽²⁾.

Inflammation of atrial tissue leads to the denaturation, necrosis, apoptosis, fibrosis and scarring of myocardial cells. Such changes alter their electrophysiological function, increase their non-uniform and anisotropic properties, and decrease the conduction of atrial muscles, facilitating reentry of the electrical signal and causing AF to persist. Interstitial fibrosis of atrial cells may be involved in atrial structural remodeling⁽³⁾.

Atrial fibrillation may occur and persist due to atrial remodeling exacerbated by inflammation. The systemic response to inflammation, which occurs in human organism, is in its essence a combination of

pathophysiological and biochemical changes aiming to limit the harmful effects (inflammatory stimuli) and to quickly recover homeostasis. They follow both acute and chronic inflammation⁽⁴⁾.

The objective of the study was to study epidemiology of paroxysmal atrial fibrillation.

PATIENTS AND METHODS

This case-control study was conducted on thirty eight participants (19 males and 19 females) who aged between 48 and 82 years. The included patients were recruited from Cardiology Department, Zagazig University Hospitals and Nasser Institute for Research and Treatment.

Patients with AF were assigned into two groups (AF and control who were individuals with sinus rhythm and no history of AF, as confirmed in a routine physical examination and investigation, each group enrolled age- and sex- matched nineteen patients.

Inclusion Criteria:

The study population included 38 cases divided into 2 groups: AF group (19 cases) and Control group (19 cases).

Exclusion Criteria:

Those with missing HRV data on 2-min recordings. Hepatic and renal insufficiency. Thyroid disorders. Rheumatic heart diseases, and electrolyte abnormalities e.g., hypomagnesemia.

Operative Design:

Data collection

1. Detailed history.
2. Clinical examination.

Thorough physical examination including complete general examination and local cardiac examination were performed for every patient.

Ethical consent:

An approval of the study was obtained from Zagazig University Academic and Ethical Committee. Every patient signed an informed written consent for acceptance of the study. This work has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for studies involving humans.

Statistical Analysis

All data were collected, tabulated and statistically analyzed using SPSS version 22. Continuous Quantitative variables were expressed as the mean ± SD & range. Categorical qualitative variables were expressed as absolute frequencies (number) & relative frequencies (percentage).

Continuous data were checked for normality by using Shapiro Walk test. Paired sample t test was used to compare between two groups of normally distributed data. Categorical data were compared using Chi-square test (χ^2 test). All tests were two sided. P-value ≤ 0.05 was considered statistically significant (S) and p-value > 0.05 was considered statistically non-significant (NS).

RESULTS

Age: In group 1, it was 61.2 ± 9.1 while in group 2, it was 58 ± 12. (P = non-significant 0.08). **Sex:** In group 1, there were 10 males and 9 females, while in group 2, there were 11 males and 8 females (P = non-significant 0.09).

Smoking: In group 1, there were 11 patients (57.9%) with smoking, while in group 2 there were 8 patients (42.1%) with smoking (P = non-significant 0.893).

Hypertension: In group 1, there were 11 patients (57.9%) with hypertension, while in group 2, there were 14 patients (73.7%) with hypertension (P = non-significant 0.58). There was no significant difference regarding demographic data and risk factors (**Table 1**).

Table (2) showed that palpitation, in group 1, there were 15 patients (78.9%) with palpitation and 4 patients (21.1%) without palpitation. In group 2, there were 2 patients (10.6%) with palpitation and 17 patients (89.4%) without palpitation (P < 0.001). Concerning chest pain, in group 1, there were 7 patients (36.6%) with chest pain and 12 patients (63.2%) without, while in group 2 there were 5 patients (26.3%) with chest pain and 14 patients (73.7%) without (P = non-significant 0.4). About dyspnea, in group 1, there were 9 patients (47.4%) with dyspnea and 10 patients (52.6%) without, while in group 2, there were 5 patients (26.3%) with dyspnea and 14 patients (73.7%) without (P = non-significant 0.38). This table showed that there was highly statistically significant difference between the studied groups regarding occurrence of palpitation which was found to be significantly higher among patients with AF compared to control groups (78.9% versus 10.6% respectively).

Table (1): Baseline characteristics among the studied groups

Variable	AF group (n=19)		Control group (n=19)		t Test	P
	No.	%	No.	%		
Age: (years) Mean ± SD	61.2±9.1		58±12		2.607#	0.083 (NS)
	No.	%	No.	%	χ^2	P
Sex:						
Male:	10	52.6	11	57.9	0.141	0.931 (NS)
Female:	9	47.4	8	42.1		
Smoking:						
No:	8	42.1	11	57.9	1.839	0.893 (NS)
Yes:	11	57.9	8	42.1		
Hypertension						
Absent:	8	42.1	5	26.3	1.078	0.583 (NS)
Present:	11	57.9	14	73.7		

Table (2): Clinical presentation among the studied groups

Variable	AF (n=19)		Control group (n=19)		χ^2	P
	No.	%	No.	%		
Palpitation:						
Absent:	4	21.1	17	89.4	22.21 \$	<0.001 (HS)
Present:	15	78.9	2	10.6		
Chest pain:						
Absent:	12	63.2	14	73.7	1.81 \$	0.404 (NS)
Present:	7	36.8	5	26.3		
Dyspnea:						
Absent:	10	52.6	14	73.7	1.925 \$	0.380 (NS)
Present:	9	47.4	5	26.3		

χ^2 : (\$) Chi-square test. AF: Atrial fibrillation

DISCUSSION

AF is a common arrhythmia resulting in significant morbidity and mortality (5). AF can be classified into many subtypes depending on its characteristics and duration. Paroxysmal AF is defined as intermittent episode that terminating spontaneously or within seven days of treatment (2). Paroxysmal AF is estimated to constitute from 25% to 60% of all AF cases and its recurrence is associated with structural and electrical remodeling of the myocardium (6, 7).

The pathophysiology of AF is complex and multifactorial, involving ageing and a structural remodeling whereby apoptosis, inflammation and fibrosis are the hallmarks (8). Systemic inflammation is a strong predictor of atrial fibrillation. A key role for electrical remodeling is increasingly recognized, and experimental data suggest that inflammatory cytokines can directly affect connexins resulting in gap-junction dysfunction (9).

Regarding baseline characteristics, it was reported that mean age of AF group was 61.2 ± 9.1 years and control group was 58 ± 12 years with no statistically significant difference between the studied groups regarding demographic data and risk factors. This is in agreement with a case-control study included AF patients either paroxysmal or permanent aged from 37 to 70 years (mean 59.7 ± 6.5 years) and controls without AF similar in gender and age (10). In addition, a case-control study described that there was no significant difference between the groups (AF and healthy controls) in terms of age and sex ratio (11). On the other hand, a case control study included 103 patients with AF and 81 normal controls, with no history of AF showed that controls were younger than patients with paroxysmal and permanent AF (66.6 ± 12.5 years for paroxysmal AF group, 73.7 ± 9 years for permanent AF group and 50 ± 13 years for controls, $P=0.01$). The AF and control groups were matched for hypertension and smoking while hypertension was more common in AF patients, however there were no differences between the AF and control subgroups (3).

Regarding clinical presentation, it was observed that palpitation occurred in about three fourth of AF group compared to control group (78.9% and 10.6% respectively). Chest pain was more presented in AF group than in control group (36.8% vs 26.3% respectively), while dyspnea was more presented in AF group than in control group (47.4% vs 26.3% respectively). **Chua et al.** (13) found that among 32 consecutive patients with suspected arrhythmia there were 17 (53.1%) referred for palpitation, 3 (9.4%) for dizziness or presyncope, 8 (25.0%) for syncope, and 4 (12.5%) for ischemic stroke. Symptoms of AF are similar to other arrhythmias like palpitations, dyspnea at rest or exertion, angina-like symptoms, fatigue or decreased exercise tolerance, lightheadedness, diaphoresis, dizziness and syncope (12).

Sibley and Muscedere (14) reported shorter mean duration of AF arrhythmia until hospitalization that was 8.14 ± 0.76 hours. This can be explained by different population and health services facilities.

CONCLUSION

Mean age of AF group and control group was high. Most of AF patients were smokers and had hypertension. Palpitation occurred in about three fourth of AF group compared to control group (78.9% and 10.6% respectively). Chest pain was more presented in AF group than in control group and dyspnea was more presented in AF group than in control group.

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