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Clinical Patterns and Short-Term Outcomes of Atrial Fibrillation in a Tertiary Cardiac Center: A Retrospective Study

Conflict of interest: nothing to declare.

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Abstract

Introduction. Atrial fibrillation (AF) represents the most common cardiac dysrhythmia. AF is closely linked to multiple risk factors, such as hemodynamic stress, left ventricular dysfunction, mitral or tricuspid valve disease, pulmonary or systemic hypertension, myocarditis, atrial ischemia, pericarditis, pulmonary embolism, pneumonia, lung cancer, and hypothermia. Alcohol and drug use; hyperthyroidism; diabetes; pheochromocytoma; subarachnoid hemorrhage; stroke; family history of AF; anemia and chronic kidney disease.

Purpose. To study the causes of AF pattern in Maysan province.

Materials and methods. A retrospective cross-sectional study in the cardiac diseases and surgery center in Maysan for a period of one year from February 2023 till February 2024, the study involved 50 cases of AF.

Results. Patients mean age was (53.6 ± 19.5) years, (58%) of sample are above the age of 50 years and of male gender, 21 patients (48%) were females. Permanent AF was the most common type (68%). AF was controlled by DC cardioversion in 35 patients (70%). Ischemia was the most common know etiology to AF with 19 patients (38%).

Conclusion. AF was prevalent among individuals aged over 40 years. A study with further follow up to estimate the percentage of patients with AF who develop left atrial enlargement and further studies with longer time period and multicentric approach to provide sufficient evidence about the endpoint of left atrium enlargement a predictor of prognosis and mortality in patients with AF.

Keywords: atrial fibrillation, arrhythmia, coronary artery disease, echo, left ventricular dysfunction



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Клинические проявления и краткосрочные результаты лечения фибрилляции предсердий в кардиологическом центре третьего уровня: ретроспективное исследование

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Резюме

Введение. Фибрилляция предсердий (ФП) является наиболее распространенным нарушением сердечного ритма. ФП тесно связана с множеством факторов риска, таких как гемодинамический стресс, дисфункция левого желудочка, заболевания митрального или трикуспидального клапана, легочная или системная гипертензия, миокардит, ишемия предсердий, перикардит, тромбоэмболия легочной артерии, пневмония, рак легкого и гипотермия. Употребление алкоголя и наркотиков, гипертиреоз, диабет, феохромоцитома, субарахноидальное кровоизлияние, инсульт, наследственная предрасположенность к ФП, анемия и хроническая болезнь почек также являются факторами риска возникновения ФП.

Цель. Исследовать причины возникновения и клинические проявления ФП в провинции Майсан (Ирак).

Материалы и методы. Ретроспективное кросс-секционное исследование проводили в Центре сердечно-сосудистой хирургии в Майсане в течение одного года, в период с февраля 2023 по февраль 2024 г. В исследовании приняли участие 50 пациентов с ФП.

Результаты. Средний возраст пациентов составил $53,6 \pm 19,5$ года, 58% испытуемых были мужчинами старше 50 лет, женщин было 21 (48%). Наиболее часто встречалась устойчивая ФП (68%). ФП купировали с помощью электрокардиоверсии у 35 пациентов (70%). Ишемия была наиболее распространенной известной этиологией ФП (у 19 пациентов (38%)).

Заключение. ФП преобладала среди лиц старше 40 лет. Необходимы дальнейшие исследования с последующим наблюдением для установления процента пациентов с ФП, у которых развилась гипертрофия левого предсердия, а также дополнительные исследования с более длительным периодом наблюдения и многоцентровым подходом для получения достоверных доказательств того, что увеличение левого предсердия является предиктором прогноза и смертности у пациентов с ФП.

Ключевые слова: фибрилляция предсердий, аритмия, ишемическая болезнь сердца, эхокардиография, дисфункция левого желудочка

■ INTRODUCTION

No matter how symptomatic or how quickly it resolves, the first identifiable episode is what is used to categorize atrial fibrillation (AF). A group of specialists from the ACC, AHA, and HRS have come up with guidelines for the treatment of AF that suggest classifying the condition into three distinct patterns [1]. Thyrotoxicosis, electrolyte imbalances, and acute ethanol intoxication are examples of reversible causes of AF that are not related to this categorization paradigm. Acute pulmonary illness, pericarditis, sepsis, AF, acute myocardial infarction, and cardiac surgery are all considered separate entities in clinical practice [2].

Hemodynamic stress due to mitral or tricuspid valve disease, left ventricular dysfunction, systemic or pulmonary hypertension, and other conditions are among the many risk factors linked to AF [3]. Myocarditis, pericarditis, atrial ischemia, pneumonia, hypothermia, lung cancer, and pulmonary embolism are some of the additional associated conditions. Important considerations include hyperthyroidism, diabetes, pheochromocytoma, subarachnoid hemorrhage, and stroke, in addition to substance usage (including drugs and alcohol). An additional risk factor includes a history of AF, anemia, or chronic renal illness in the family.

If abnormal cardiac rhythms detected by auscultation are indicative of AF, a 12-lead electrocardiogram (ECG) should be conducted. An irregularly irregular narrow complex tachycardia is shown on the ECG [4]. The QRS complexes could show signs of enlargement. It is crucial to keep an eye on electrocardiographic signs of related heart problems, such as pre-excitation and left ventricular hypertrophy (LVH) [5–7].

Guidelines for cardioversion of AF (AF) were issued in 2014 by the Heart Rhythm Society (HRS), the American Heart Association (AHA), and the American College of Cardiology (ACC) [8]. For individuals suffering from nonvalvular AF (AF), the American College of Cardiology (ACC), American Heart Association (AHA), and Heart Rhythm Society (HRS) have issued 2014 recommendations on anticoagulation [9].

AF (AF) catheter ablation and surgical procedures attempt to remove AF-related substrates and/or eliminate AF-related triggers. Radiofrequency ablation and mapping of AF is an intricate process. The cardiac electrophysiologist's level of skill and the specific features of AF dictate the method(s) used [10].

Ablation treatments that target the pulmonary veins are helpful in ending paroxysmal AF, which often occurs from triggered or ectopic activity inside these veins. There is a lower success rate in terminating persistent AF (AF) with ablation compared to paroxysmal AF because of the need to thoroughly map and ablate the atrial tissue for triggering foci and re-entry circuits [11].

Roux et al. found that anti-arrhythmic drug treatment for six weeks after ablation of paroxysmal AF was well tolerated, significantly reducing the incidence of clinically significant atrial arrhythmias and the need for cardioversion or hospital admission during this period. Class IC agents were the primary therapeutic strategy, with sotalol being the most commonly prescribed medication in cases of left ventricular dysfunction or coronary



artery disease. The measured outcomes included atrial arrhythmias lasting more than 24 hours, those associated with severe symptoms requiring hospitalization, cardioversion, or changes in antiarrhythmic drug therapy, and intolerance to antiarrhythmic medications resulting in discontinuation [12].

Modification of the atrioventricular (AV) node may provide an alternative treatment for patients with persistent AF (AF) who demonstrate an uncontrolled ventricular response despite rigorous medical management. Catheter ablation of the atrioventricular junction leads to a permanent interruption of conduction between the atria and ventricles [13].

A permanent ventricular pacemaker is indicated due to the presence of permanent AV block. AF may persist; however, the pacemaker modulates the ventricular response. The risk of thromboembolism persists, requiring ongoing anticoagulation for patients; however, most report relief from symptoms. During the first 1-3 months, the pacing rate should be maintained between 80 and 90 beats per minute to reduce the risk of torsade de pointes, which may arise from slow ventricular rates and early after-depolarizations. In patients with ventricular dysfunction, defined by a left ventricular ejection fraction below 50% and necessitating permanent ventricular pacing, the indication for a biventricular device may arise [14].

Evidence indicates improvements in left ventricular size and function, functional class, and quality-of-life scores [15].

■ PURPOSE OF THE STUDY

To study the causes of AF pattern in Maysan province.

■ MATERIALS AND METHODS

Study design

A retrospective cross-sectional study was conducted in the cardiac diseases and cardiac surgery center for a period of one year from February 2023 till February 2024, data collection continued for 3 months after approval of the research proposal was gained by the Arab Board of health specializations / local Council of medicine / Iraq. The study included 300 patients that were admitted to the center for various reasons for a period of 3 months, all of them had underwent various investigations including ECG to confirm the presence of AF, 50 patients had AF, the other 250 cases without AF were excluded from further analysis.

Data collection

Following the acquisition of informed consent from all participating patients, the researcher commenced data entry into a pre-structured paper questionnaire that encompassed the subsequent elements:

1. Patients demographic data of Age, Gender, Residency and marital status.
2. Past medical history: history of AF, method of control, drugs history and any history of risk factors and associated comorbidities including: hypertension, ischemic heart disease, cardiomyopathy, thyrotoxicosis, pulmonary hypertension and dyslipidemia.

Laboratory examinations were conducted on the patients, including testing for thyroid function, serum electrolytes, and random blood sugar (RBS). Additional imaging modalities included chest X-ray, 12-lead electrocardiography, and echocardiography.

Electrocardiogram

In order to detect AF, all patients had a conventional 12-lead ECG recorded. When the ECG reveals irregular or undulating baseline, fibrillatory 'F' waves, fluctuating R-R intervals, and no P-waves, it is considered a definitive diagnosis of AF. All fifty patients diagnosed with AF had their ECG results recorded on paper.

Chest X-ray

The patient underwent a chest X-ray with a postero-anterior (PA) view to look for signs of left atrial enlargement, cardiomegaly, and pulmonary congestion.

Echocardiography

Every single occurrence of echocardiography followed the protocols set out by the American Society of Echocardiography. In order to diagnose AF, pulmonary hypertension, dilated cardiomyopathy, and any underlying structural heart disease, echocardiography was used. The next step was to transform the data into an Excel file and send it off for statistical analysis.

Statistical analysis

Version 24 of the Statistical Package for the Social Sciences (SPSS Inc., Chicago, IL, USA) was used for the statistical analysis of the data. Common statistical tools used to display the data were percentages, means, standard deviations, and frequencies. Using the student's t-test, paired t-test, ANOVA, and chi-square test, we determined if there were statistically significant differences among the different means of the quantitative data. Under the criteria of [16–20], a P value below 0.05 was considered statistically significant.

■ RESULTS

The study included 50 patients with AF their mean age was 53.6 ± 19.5 years, 58% of the study sample are above the age of 50 years and of male gender, 21 patients (48%) were females. Most of them (64%) live in urban areas with 32 patients and the other 18 patients (36%) live in rural distinct. Most of the patients are married (76%) with 38 patients, 3 patients are single (6%) and 9 patients are divorced or widowed (18%) (Table 1).

Permanent AF was the most common type (68%) with 34 patients having it, followed by persistent type (22%) 11 patients and paroxysmal with 5 patients (10%). AF was controlled by DC cardioversion in 35 patients (70%), cardiac ablation has been done in 6 patients (12%) to controls AF, and only 9 patients (18%) restricted to medical treatment (Table 2).

Electrocardiograms (ECGs) were performed on all patients to confirm the diagnosis of AF, with the absence of P waves and irregular R-R intervals observed in 100% of cases. Thirty-two patients, representing 64%, exhibited coarse fibrillatory waves, the other 18 patients (36%) had fine fibrillatory waves. Left ventricular hypertrophy was present in 8 patients (16%) while right ventricular hypertrophy was more common with 12 patients (24%). Left axis deviation was found in 6 patients (12%) and right axis deviation in 13 patients (26%). Ischemic change was present in 10 patients (20%), myocardial infarction combined AF in 12 patients (24%) (Table 3).

AP chest X-ray was done to all the patients to detect AF associated radiological signs, cardiomegaly was found in 34 patient (68%), left atrium enlargement in 26 patients (52%) and pulmonary congestion in 8 patients (16%), chest X-ray was relatively normal in 15 patients (30%) (Table 4).

Table 1
Demographic characteristics of the study sample

Variable		No.	%
Age (years)	Mean±SD	53.6±19.5	
	≤20	1	2
	20–30	3	6
	31–40	6	12
	41–50	11	22
	51–60	15	30
	>60	14	28
Gender	Males	29	58
	Females	21	42
Residency	Urban	32	64
	Rural	18	36
Marital status	Single	3	6
	Married	38	76
	Divorced /widowed	9	18

Table 2
AF variables of the patients

Variables		No.	%
AF type	Paroxysmal	5	10
	Persistent	11	22
	Permanent	34	68
Control	DC	35	70
	Ablation	6	12
	Medications	9	18

Table 3
Electrocardiogram findings in patient with AF

ECG findings	No.	%
Absent P-wave	50	100
Irregular R-R interval	50	100
Coarse Fibrillatory waves	32	64
Fine fibrillatory waves	18	36
Left ventricular hypertrophy	8	16
Right ventricular hypertrophy	12	24
Left axis deviation	6	12
Right axis deviation	13	26
Ischemic changes	10	20
Myocardial infarction changes	12	24

Table 4
X-ray Chest findings in AF patients

Chest X-ray findings	No.	%
Cardiomegaly	34	68
Left atria enlarged	26	52
Pulmonary congestion	8	16
Normal	15	30

Table 5
AF etiology among the study participants

Causes of AF	No.	%
IHD	19	38
Hypertension	15	30
Cardiomyopathy	6	12
Pulmonary hypertension	4	8
Thyrotoxicosis	2	4
Dyslipidemia	1	2
Lone AF	3	6

Ischemia was the most common know etiology to AF with 19 patients (38%) having a history of IHD, hypertension was the followed communist associated comorbidity with 15 patients (30%), cardiomyopathy was found in 6 patients (12%), pulmonary hypertension induced AF was diagnosed in 4 patients (8%), thyrotoxicosis in 2 patients (4%), dyslipidaemia was the only cause in one patient (2%), no know etiology was found in 3 patients (6%) (Table 5).

■ DISCUSSION

The current study found that the average age of the participants was 53.6±19.5 years, with 58% of the participants being over the age of 50. Previous research has shown that age is a significant risk factor for AF, with older participants being more likely to experience the condition, and younger participants appearing to be protected from stressors and conditions that can increase the risk of AF. Nevertheless, the exact chemical processes that underlie this correlation are still not well understood [21].

Similar to other risk factors for cardiovascular disease, men were more prevalent than women (58% vs. 42%). Although AF (AF) is more often linked to men, a study conducted by Michelena HI et al. found that women with AF had a greater mortality rate than men with AF. In addition, the risk of stroke is higher in women with AF than in males. Women suffering from AF can greatly benefit from anticoagulation treatment. Taking warfarin carries a considerable risk of bleeding, however this risk is not different for men and women. AF symptoms are more common in women than in males, and when antiarrhythmic medicine is used as part of a rhythm-control approach, the results are worse for women. Sotalol and dofetilide increase the risk of torsade de pointes in women, while antiarrhythmic drugs increase the risk of bradyarrhythmias in women [22].

The majority of cases of AF are controlled by diaphragmatic cardioversion (DC), which accounts for 70% of cases. However, a large-scale randomized clinical trial conducted by Mogensen et al. on 15,415 patients admitted to the emergency department revealed that paroxysmal AF was the most common type, present in 1,645 patients (30.0%). This finding may be due to the fact that the trial was carried out in a tertiary cardiac center, where patients with new-onset AF are typically admitted to the ED and managed with medication before being discharged home. Patients who experience resistance to medication or DC are referred to the cardiac center for conversion to DC and further management with medication or ablation. As a result, the current study sample may not be representative of the various types of AF [23].



Several studies have shown that AF and heart failure (HF) coexist and share risk factors. For example, a study by Prabhu et al. found that up to 30% of patients with AF [24]. The higher percentage observed in the current study is also explained in the same way. The study sample is based on cases that were not controlled at the emergency room and referred to a cardiology center. The researchers Smit et al. looked at how patients' AF and heart failure episodes unfolded. For this study, researchers looked at two groups: one that had AF before or at the same time as heart failure ("AF first"), and another that had heart failure first ("heart failure first"). Most patients hospitalized for both diseases previously suffered AF before heart failure, according to the study. In comparison to individuals whose heart failure occurred before AF, these patients often had a better prognosis [25].

AF is most commonly caused by ischemic heart disease (38% of cases), according to the present study. Afterwards, 30% of patients developed hypertension, 12% had cardiomyopathy, and 8% developed pulmonary hypertension. A research done by Pedersen et al. on 3587 patients similarly indicated that IHD is the most prevalent cause of AF, notably in western nations [26]. Thyrotoxicosis and dyslipidaemia were detected in 4% of patients, whereas lone AF occurred in 6% of patients. While hypertension was identified as the leading cause of AF in a research by Verbiest-van et al., it was followed by coronary artery disease (16.6%) and cardiomyopathy (15.3%). One quarter of women and eight percent of men cited rheumatic heart disease as the reason [27].

In 38 patients (54.28% of the total), rheumatic heart disease was identified as the leading cause of AF in an Indian investigation by Eromosele et al. Possible explanations for the contradictory results include differences in illness prevalence among regions. Despite the widespread use of antibiotics, the prevalence of rheumatic fever has decreased in Iraq, making rheumatic heart disease the leading cause of cardiac problems in the country (22% to 50% of all cardiac cases) [28].

■ CONCLUSIONS

The most frequent kind of AF (AF), which is permanent and more common in males, was AF, which was most common in those older than 40. Left atrial enlargement is a predictor of prognosis and mortality in patients with AF; extra research with longer time periods and a multicentric approach is needed to determine the percentage of patients with AF who develop this endpoint.

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