

Clinical Profile and Coronary Artery Findings in Patients with Atrial Fibrillation

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Abstract:

Background: Atrial fibrillation is a common arrhythmia in daily practice and one of the heart disorders with the highest morbidity and death rates, as it is responsible for a huge number and negative consequences. In our country, there is limited information on the prevalence of natural history of the less well-defined clinical types.

Objective: To assess the clinical profile and coronary artery findings in atrial fibrillation patients.

Patients and Methods: This cross-sectional study was conducted during the period from the first of October 2019 to the end of July 2021 at the Iraqi Center for heart diseases at Baghdad Medical City. It included 32 Iraqi patients with atrial fibrillation of both genders. Angiography was performed by the femoral artery approach, Data were collected by history, thorough clinical examination, and investigations, using a data collection sheet

Results: The main type of atrial fibrillation was the chronic one, (62.5%), Echocardiography findings revealed systolic dysfunction in 31.1% of patients, diastolic dysfunction in 37.5%, and both dysfunctions in 6.2%. The left atrium was dilated in 13 patients (40.6%). Angiographic findings revealed RCA lesions in 13 (40.6%) patients, left circumflex artery in 9 (28.1%) while both RCA and LCA lesions were present in 3 (9.4%) patients. LAD lesions were reported in 10 (31.2%) patients, LCX in 27.8%, and LMS in 16.8%.

Conclusion: Chronic AF was the more frequent type, Systolic and diastolic dysfunction are frequent among AF patients. RCA was more frequently affected than LCA, LAD was the more affected branch.

Keywords: Atrial fibrillation, Angiography, coronary artery, Echocardiography.

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Introduction:

Atrial fibrillation (AF) is a serious arrhythmia that affects a large percentage of people. It is more common as people get older. (1, 2) It affects roughly 1% of individuals under the age of 60 and about 8% of patients over the age of 80. AF can produce a variety of symptoms and have a negative impact on both functional status and quality of life (3). Atrial fibrillation is a supraventricular tachyarrhythmia marked by uncoordinated atrial activity and concomitant mechanical atrial function impairment. (4) Because it inhibits heart function and has various prognoses and treatment choices, atrial fibrillation is a substantial cause of morbidity and mortality. Furthermore, the expense of caring for people with atrial fibrillation is approximately five times that of caring for patients who do not have it. Atrial fibrillation is a risk factor for death on its own. It can also cause or aggravate heart failure, as well as raise

death rates in people who are already suffering from it have had myocardial infarction. (5). AF may manifest itself in a variety of ways and in a variety of clinical contexts. The following classification approach, published by the ACC/AHA/ESC recommendations (4), is recommended for AF management: (6) Paroxysmal AF: Episodes that begin and end on their own, usually lasting less than 24 hours but occasionally up to 7 days. Persistent AF refers to episodes that persist more than 7 days or that require pharmacological or electrical treatment to stop. Permanent AF refers to episodes that have lasted for a long time and have eluded all attempts to end them. Lone: Affects people younger than 60 years old who have no clinical or echocardiographic reasons. Atrial fibrillation in patients with valvular diseases, prosthetic heart valves, or valve repair are not considered nonvalvular atrial fibrillation recurrent atrial fibrillation is defined as two or more episodes of atrial fibrillation. Secondary: Occurring as a result of a different underlying condition or occurrence (e.g., myocardial infarction, cardiac surgery, pulmonary disease, and hyperthyroidism). (4, 6)

Atrial fibrillation may manifest itself in a variety of ways. Some people may have no signs or symptoms, others may have a stroke, overt heart failure, or

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cardiovascular collapse as a symptom. Palpitations, dyspnea, tiredness, lightheadedness, and chest discomfort are the most prevalent symptoms. Because symptoms are generic, they can't be utilized to diagnose or predict when atrial fibrillation will strike. If an electrocardiogram fails to show atrial fibrillation and a strong suspicion remains, a Holter or cardiac event monitor may be required to document the arrhythmia. (4) Coronary angiography, or an *in vivo* contrast analysis of the coronary artery tree and lumen, is a standard procedure for determining the anatomy of the coronary arteries and determining the number, location, and severity of coronary stenoses. The coronary tree is observed, its branching pattern is delineated, and the inner diameter of a coronary artery is outlined by injecting 5–12 mL of radiographic contrast solution containing iodine, which is plainly visible on X-ray images of the artery. Both the right and left coronary arteries are injected multiple times after changing the position of the X-ray system to visualize the coronary tree from different perspectives. (3–7). In individuals with AF, the prevalence of CAD ranges from 17% to 46.5 percent (8–9). CAD was found in 17 percent of AF patients in large randomized trials. Only 18 percent of individuals with permanent AF were found to have CAD, according to Van Gelder Et al (10). In a study of AF patients having coronary angiography, KraleV Et al. discovered that stable CAD was found in 13% of AF patients, and that in 21% of those with CAD, percutaneous coronary intervention (PCI) or CABG was performed (11). The prevalence of permanent form of AF was similar in both groups (30 percent vs. 27 percent, respectively) in both with and without CAD (11).

Patients and Methods:

This was a cross-sectional study conducted at the Iraqi Center for the heart diseases at Baghdad Medical City, in the medical ward and coronary care unit. The study was conducted from the first of October 2019 to end of July 2021. It included patients with AF admitted to the above center and selected according to specific criteria.

Inclusion criteria:

Patients with different ages and both genders who attended to Iraqi center for heart diseases for treatment or clinically diagnosed or documented to have AF, who required coronary angiography (CA) and who accept to participate in study.

A- Selection criteria for cases: Patients presented with features of ischemic heart disease (IHD) & having atrial fibrillation.

Criteria for coronary artery disease (CAD) & Coronary Angiography (CA)

- Chronic coronary syndrome
- Acute coronary syndrome

Exclusion criteria:

- Patient with hypertrophic or dilated cardiomyopathy

- Patient with valvular heart disease
- Patient with congenital heart disease
- Patient with thyrotoxicosis
- Alcoholic patient

Procedure: Femoral Artery Puncture Technique was used to puncture the femoral artery. The common femoral artery (CFA), defined as the region above the femoral artery bifurcation and below the inferior epigastric artery, is the suitable entrance location for femoral artery puncture. The CFA is usually in the same place over the femoral head. A structured questionnaire was designed to collect information from the participants the subtending was conducted by the researcher. Some information regarding clinical factors and certain other information was obtained from the records, while other information was obtained from the patients.

Statistical analysis:

The statistical package for social sciences (SPSS) by IBM for Windows version 25 and Microsoft Excel software version 2016 were used to enter, manage, and analyze data. According to the variable type, descriptive statistics were reported as frequencies, percentages, mean, and standard deviation. The associations were evaluated using the Chi-squared test and fisher's exact tests (where Chi-squared was not suitable). To be considered a significant difference or correlation, all statistical processes and tests were conducted with a level of significance at (P. value \leq) of 0.05 or less.

Results:

A total of 32 patients with AF were enrolled in this study with a mean age of 59.7 ± 6.2 years (range: 50 – 78) years, 59.4% of the patients aged 60 years or less. Males were 15 (46.9%), diabetic (DM) and hypertensive (HT) patients were 43.8% and 78.1%, respectively, (Table 1). The main type of AF was chronic, (20/32, 62.5%) while paroxysmal AF was found in 12/32 (37.5%) patients (figure 1).

Table 1. Baseline demographic and clinical characteristics of the studied group

Variable	No.	%	
Age (year)	≤ 60	19	59.4
	> 60	13	40.6
Mean age (SD)	59.7 (6.2)		
Age range	50 - 78		
Gender	Male	15	46.9
	Female	17	53.1
DM	Yes	14	43.8
	No	18	56.3
HT	Yes	25	78.1
	No	7	21.9

SD: Standard deviation

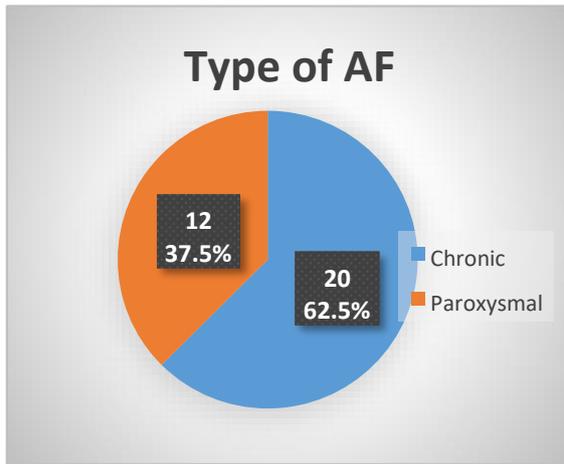


Figure 1. Types of AF of the studied group (No. = 32)

Echocardiography findings revealed Systolic dysfunction in 31.1% of patients, diastolic dysfunction in 37.5%, and both dysfunctions in 6.2%, other 8 patients had normal findings. Left atrium was dilated in 13 (40.6%) of the patients. Valvular lesion found in only one patient and ejection fraction of < 50 in 10 (31.3%) of patients with mean ejection fraction of $55.7\% \pm 8.8\%$, (Table 2).

Angiographic findings revealed RCA lesion in 13 (40.6%) patients, LCA in 9 (28.1%) while both RCA and LCA lesions were found in 3 (9.4%) patients, (Table 3).

Table 2. Echocardiography findings of the studied group (No. = 32)

Variable	No.	%
Ventricular Systolic dysfunction	10	31.3
Diastolic dysfunction	12	37.5
Both Systolic and Diastolic	2	6.2
Normal	8	25.0
Left atrium size		
Dilated	13	40.6
Normal	19	59.4
Valvular lesion		
Yes	1	3.1
None	31	96.9
Ejection fraction (%)		
< 50	10	31.3
> 50	22	68.8
Mean (SD)	55.7 (8.8)	

SD: Standard deviation

Table 3. Angiographic findings of the studied group

Angiographic finding	No.	%
RCA Lesion	13	40.6
LCA Lesion	9	28.1
Both RCA & LCA lesion	3	9.4
Normal	7	21.9
Total	32	100.0

RCA: Right Coronary artery, LCA: Left coronary artery

The relationship of AF patients' characteristics and type of AF with other findings are assessed using cross-tabulation and chi-squared test or Fisher's exact tests accordingly. No significant relationship has been found between AF patients characteristics and Echocardiographic findings, in all comparisons, P. value > 0.05 (Table 4).

Table 4. Cross-tabulation for the relationship between Echocardiographic findings and characteristics of AF patients

Variable		Echo findings			Total	P. value
		Systolic dysfunction	Diastolic dysfunction	Normal		
Age (year)	≤ 60	5	8	6	19	0.225 ns
	> 60	6	5	2	13	
Gender	Male	5	5	5	15	0.630 ns
	Female	6	8	3	17	
DM	Yes	5	4	5	14	0.139 ns
	No	6	9	3	18	
HT	Yes	7	10	8	25	0.153 ns
	No	4	3	0	7	
Type of AF	Chronic	9	5	6	20	0.241 ns
	Paroxysmal	2	8	2	12	

Ns: not significant

No significant association was found between AF patients' characteristics and type of AF from one side and each of Angiographic finding (Table 5)

Table 5. Cross-tabulation for the relationship between Angiographic finding and characteristics of AF patients

Variable		Angiographic finding			Normal	Total	P. value
		RCA	LCA	Both RCA & LCA			
Age (year)	≤ 60	8	5	1	5	19	0.719
	> 60	5	4	2	2	13	
Gender	Male	5	6	2	2	15	0.362
	Female	8	3	1	5	17	
DM	Yes	6	4	1	3	14	0.983
	No	7	5	2	4	18	
HT	Yes	10	8	2	5	25	0.793
	No	3	1	1	2	7	
Type of AF	Chronic	10	5	1	4	20	0.473
	Paroxysmal	3	4	2	3	12	

All p. values were not significant (p> 0.05)

Discussion:

A total of 32 patients were enrolled in this study with a mean age of 59.7 ± 6.2 and almost 60% of the patients at the age of 60 years or older, females were relatively dominant, represented more than half of the patients, diabetes was more frequent among the studied group, (43.8%), and majority, 78.1%, of the patients were hypertensive, compared to general population, AF patients in our study had higher frequency of DM and hypertension, where among Iraqi population, prevalence of DM according to previous studies were 19.7% in adults (19-94) years (12) and prevalence of hypertension ranged between 29.4%-40.1% (13). These higher rates of hypertension and DM was unexpected as considered as risk factors for cardiovascular diseases and AF and they have major impact in the pathogenesis, management and prognosis of AF in addition to old age (14-16). The current study found that chronic AF was more frequent than paroxysmal type, Dhungel and Shanker 2017, found that paroxysmal type was more frequent than other types where it represented 55.2% (17), nonetheless, there is a wide variation in the prevalence of different types of AF depending on differences in populations and prevalence of risk factors of AF and CAD in addition to analysis approaches (18,19) In the present study, systolic and diastolic dysfunction were found in 31.3% and 37.5% of the patients respectively. These

findings consistent with that reported in previous studies (20,21). Systolic dysfunction was also reported in previous studies, Miyamoto et al 2004, reported that nonischemic systolic dysfunction was inter-correlated with AF; and should not be diagnosed as dilated cardiomyopathy (22). The RCA was more commonly afflicted than the LCA in this study, being involved in 40.6 percent of patients compared to 28.1 percent, respectively. Also, both the RCA and the LCA were affected in two cases. Kravec et al. discovered that 38% of AF patients (23) had coronary artery disease, which agreed with our data. The distribution of stenoses, including the RCA, LAD, RCX, and minor branches of the coronary arteries, was also documented by Motloch et al. Furthermore, there was no significant difference in the percentage of coronary artery stenoses between AF and sinus rhythm patients (24). Other studies found association between RCA stenosis and the occurrence of AF, particularly during the acute infarction phase. For example, Blanton et al. evaluated AF in 1,039 patients with MI and found that occlusion of the right proximal coronary artery was associated with early onset of MI and AF. Atrial ischemia and right atrial overload contributed to development of AF in occlusion of RCA (26). Another study found that 70% of AF patients had stenosis in RCA (27) and that CAD affecting atrial branches was independent risk factor

of AF after MI. From another point of view, stenosis of RCA found to be risk factor for AF after operation. On the other hand, in patients undergoing coronary intervention, Kralev et al. found higher proportion of patients had RCA occlusion. Conversely, large systematic review found no association between localization of stenosis and AF(24). Additionally, previous studies reported that 43% of CAD patients had RCA lesions with or without circumflex branch of LCA (28)

Conclusion:

The majority of AF patients were elderly and chronic AF was the main reported type of AF. Angiographic findings showed that RCA was more frequently affected than LCA and LAD was the more affected branch followed by LCX and then LMS.

Authors' Contributions:

Saleh A. Saleh, Faris k. Khadir: students.

Ameen A. Al- Alwany: Supervisor

Conflict of Interest: There were no conflicts of interest revealed by the authors.

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الملف السريري و نتائج فحص الشريان التاجي عند مرضى الرجفان الأذيني

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الخلاصة:

خلفية البحث: الرجفان الأذيني (AF) هو عدم انتظام ضربات القلب بشكل متكرر في الممارسة اليومية واحد مشاكل القلب تفرض التأثير الصحي الأكبر مع ارتفاع معدلات المراضة والوفيات , حيث انها مسؤولة عن مجموعة كبيرة من النتائج السلبية , مسبباته متنوعة للعناية وتعتمد شدته الى حد كبير على امراض القلب او امراض خارج القلب الكامنة من بين الاشكال السريرية الاقل تحديدا , تتوفر القليل من البيانات في بلدنا حول تواترها او تاريخها الطبيعي.

الهدف من الدراسة : لتقييم الملامح السريرية ونتائج فحص الشريان التاجي في المرضى الذين يعانون من الرجفان الأذيني . كانت هذه الدراسة مقطعية اجريت خلال الفترة من الاول من تشرين الاول 2019 الى نهاية تموز 2021 في المركز العراقي لامراض القلب في مدينة بغداد الطبية . من بينهم 23 مريضا عراقيا يعانون من الرجفان الأذيني من كلا الجنسين . تصوير الاوعية الدموية من خلال نهج الشريان الفخذي تم جمع البيانات حسب التاريخ , من خلال الفحص السريري والتحققات , باستخدام ورقة جمع البيانات , تم اجراء تحليل البيانات باستخدام الحزمة الاحصائية للعلوم الاجتماعية (SPSS) الاصدار 25 , وطبقت الاختبارات الاحصائية وفقا لذلك عند مستوى دلالة 0.05 .

النتائج : كان النوع الرئيسي من الرجفان الأذيني مزمن (5.62%) , وكشفت نتائج تخطيط صدى القلب عن خلل وظيفي انقباضي في 1.31% من المرضى , واختلال وظيفي انبساطي في 5.37% , واختلال وظيفي كليهما في 2.6% وتوسع الاذين الايسر في 13 (6.40%) . كشفت نتائج تصوير الاوعية الدموية عن افة RCA في 13 (6.40%) مريضا , LCA في 9 (28.1%) بينما افات RCA و LCA موجودة في 3 (9.4%) مرضى , تم الإبلاغ عن افات LAD في 10 (31.2%) مرضى , LCX في 27.8% و LMS في 16.8% , ومع ذلك , كان لدى بعض المرضى افات في اكثر من فرع واحد من LCA , تم الإبلاغ عن تضيق كبير في 24 (75%) من المرضى . كان توسيع الاذين الايسر اكثر تواترا بشكل ملحوظ في مرضى الرجفان الأذيني المزمن ($P < 0.05$) .

الاستنتاج: كان الرجفان الأذيني المزمن هو النوع الاكثر شيوعا , والضعف الانقباضي والانبساطي شائع بين مرضى الرجفان الأذيني , تآثر RCA بشكل متكرر اكثر من LCA , وكان LAD هو الفرع الاكثر تضرراً , وتم الإبلاغ عن تضيق كبير في غالبية المرضى . لم يتم العثور على علاقة بين خصائص مرضى الرجفان الأذيني .

مفتاح الكلمات: رجفان أذيني, تصوير الأوعية الدموية, الشريان التاجي, تخطيط صدى القلب.