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Correlation between the severity of coronary artery disease and gender in patients with non-valvular atrial fibrillation (NVAF)

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Abstract
Background: Nonvalvular atrial fibrillation (NVAF) frequently coexists with coronary artery disease (CAD); as they share similar risk factors and pathophysiology. However, effect of gender on both is not studied well, the objective of this study is to evaluate the relation between the gender and coronary angiographic findings of NVAF patients in Sohag University Hospital Cath. Lab.
Methods: This study is a prospective, randomized, comparative, single center study that included all patients with NVAF attended Sohag University Hospital Cath. Lab. for Coronary angiography from first of January 2017 till end of December 2020 compared to an equivalent number of patients with sinus rhythm at the same period. Demographic data, risk factors of coronary artery disease, different presentations, echocardiographic and coronary angiographic findings were analyzed and assessed
Results: More than half (56.2%) of patients with NVAF has CAD. However CAD was more in patients with sinus rhythm representing (89.3%). Men were more common than women in the two groups, and also had CAD, in fact (84%) of men in this study had CAD**.**
Conclusion: There is a significant relation between gender and CAD in NVAF patients. Male gender is considered a strong risk factor for CAD in patients with NVAF and with sinus rhythm as well.

Keywords: Correlation, severity, coronary artery

Introduction

Atrial fibrillation (AF) is documented as the commonest grave cardiac arrhythmia, In the United states of America (USA) it affects 2.3 million individuals (nearly 2% of individuals younger than sixty five years of age have AF, while nearly 9% of individuals aged sixty five years or older) have AF, and in the European Union (EU) 4.5 million individuals (nearly 0.12%–0.16% of people younger than forty nine years of age, 3.7%–4.2% of people aged 60–70 years, and 10%–17% of people aged eighty years or older) have AF [1, 2, 3]. AF is associated with diversity of symptoms, major mortality and morbidity and reduced quality of life [4, 5]. The AF patients' mortality rate is nearly twice that of patients with normal sinus rhythm. Notably, this observation is attributed to the augmented cardiac death caused by associated cardiovascular disease [6–9] instead of to thromboembolism [10]. Coronary artery disease (CAD) is vastly prevalent in patients with AF and can be one of its etiologies [11]. Additionally, the lone manifestation of CAD can be AF [12]. Remarkably, epidemiological data have point out that one of the commonest underlying causes of death among patients with AF is CAD [13]. Notably, after acute myocardial infarction (MI), development of AF is related to a worse prognosis [14]. Some studies have found common cardiovascular risk factors between CAD and AF for instance hypertension, diabetes and obesity that support the association between CAD and AF. [15, 16]. The Framingham study supported that angina predisposed to AF and that the association of AF with CAD was stronger in men [7]. Despite the high prevalence of CAD in patients with AF of 18–46.5% [8, 11, 17, 19], the prevalence of AF in patients with confirmed CAD is very low, at 0.2–5% [20-23]. In contrast, a survey of historic literature by Zipes indicates that AF usually arises in patients with CAD [24]. Over the years, the incidence of cardiovascular risk factors have dramatically increased and this is anticipated to continue. [19, 25] Moreover, the interest in investigating patients with AF has grown owing to the probability of specific antiarrhythmic treatment for CAD and non-vitamin K oral anticoagulants (NOAC). [26-28]

The aim of the study

The aim of this study is to evaluate the relation between the presence of coronary artery disease and the Gender in patients referred for sohag university Cath. Lab with nonvalvular atrial fibrillation (NVAF).

Methods

This study is a prospective, randomized, single center study that included all patients with NVAF attended Sohag University Hospital Cath. Lab. for Coronary angiography from first of January 2017 till end of December 2020 in comparison with an equivalent number of patients with sinus rhthem. Demographic data, risk factors of

coronary artery disease, different presentations, echocardiographic and coronary angiographic findings were analyzed and assessed.

Study population

112 patients with NVAF. (NVAF is defined as: AF without moderate-to-severe mitral stenosis or a mechanical heart valve; as mentioned in the focused update of the 2019, (AHA/ACC)/HRS Guideline for the management of patients with AF) [22] in comparison with 112 patients with sinus rhythm, Presented to Sohag University Hospital Cath. Lab. from the first of January 2017 till the end of December 2020

Exclusion criteria

Patients with valvular AF (defined as: AF with moderate-to-severe mitral stenosis or a mechanical heart valve; as mentioned in the focused update of the 2019, (AHA/ACC)/HRS Guideline for the management of patients with AF [22].

Data collection

Data were collected by direct contact with patients and with the cath. Lab. files.

All patients were subjected to:

a. **History taking:** including history of age, smoking, hypertension, diabetes, previous cerebrovascular accident, the presenting symptom, previous myocardial infarction, acute coronary syndrome or previous coronary angiography.
b. **Clinical examination:** pulse rate and rhythm, blood pressure measurement was taken twice (2-5 days before coronary angiography and on the day of angiography) and was categorized according to ESC 2018 management of arterial hypertension guidelines [23], presence of signs of heart failure (raised jugular venous pressure, lower limbs edema, basal chest crepitations), body mass index (BMI) calculation.
c. **CHA2DS2VASc score calculation** for patients with AF
d. **Laboratory tests:** were done in Sohag University Hospital including: complete blood count (CBC), random blood sugar test and glycosylated hemoglobin (HGBA1c) (were categorized according to the 2019 Guidelines on Diabetes) [137] Lipid profile, serum creatinine level, INR, and TSH Level.
e. **12 lead Electrocardiogram** and recording of (HR, rhythm and suggestive ischemic and old MI findings).
f. **Transthoracic Echocardiographic examination** was done in our echocardiography clinic with Philips envisor machine and assessment of cardiac chambers size, cardiac valves structure and function, presence of left ventricular hypertrophy (LVH), systolic wall motion abnormalities (SWMA) at rest and diastolic dysfunction (DD), ejection fraction (EF%), estimated pulmonary artery systolic pressure, type of heart disease (if present), and presence of spontaneous echo contrast or thrombus.
g. **Coronary angiography** was done in Sohag University Cath.Lab. by Toshiba Infinix- CBI using Sterilization & local infiltration anesthesia of the right groin, Right femoral artery puncture using seldindger's technique, Selective left and right coronary angiography in multiple views using JL4 and JR4 Catheters respectively, assessment of left and right coronary arteries as regard presence of atherosclerosis or stenosis and its site and percentage and the final interpretation was done

Ethical considerations

This research has been revised and approved by scientific ethical committee of Sohag faculty of medicine and an informed written consents has been taken from all patients included in this study.

Statistical analyses

Statistical analyses were performed using Statistical package for social sciences statistical program (SPSS version 22.0).

Results

A total of 112 patients with NVAF were analyzed and compared to 112 patients with Sinus rhythm (SR). The demographic variables of the individual groups with and without AF are shown in (Table 1) and (figure 1)

Table 1: The gender difference in the two groups

Gender	Total N= 224		AF n= 112		SR n= 112		P value
	No.	%	No.	%	No.	%	
Men	131	58.5%	58	51.8%	73	65.2%	0.04
Women	93	41.5%	54	48.2%	39	34.8%	

AF: Atrial fibrillation, SR: sinus rhythm

Men were generally more commonly presented than women, they were 131 patients representing (58.5%) of the total number of patients in the study, However significantly more men were presented in sinus group (65.2%) than in NVAF group (51.8%).

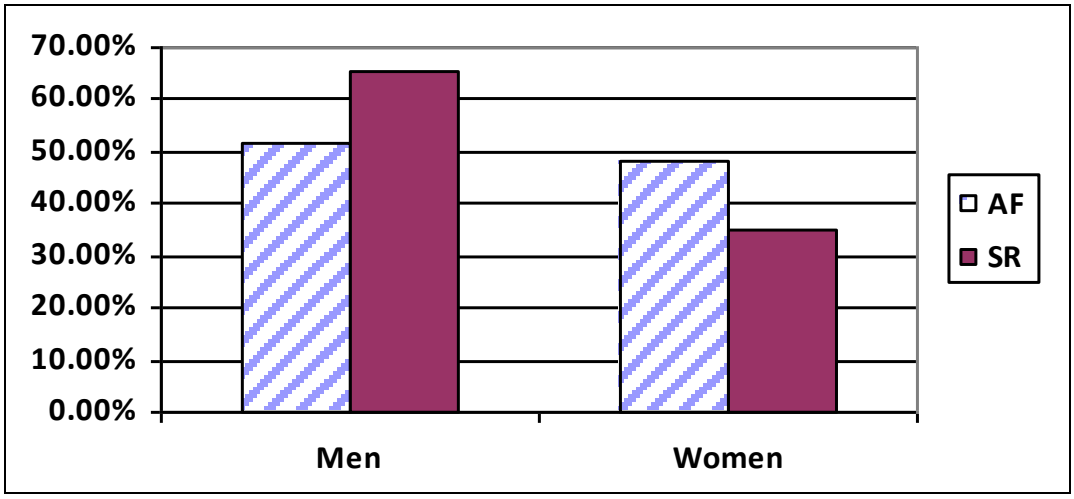

Fig 1: The gender difference in the two groups

The coronary angiographic results were as the following (table 2) and (figure 2)

Table 2: the coronary angiographic results in the two groups

Coronary angiography result	AF		SR	
	No.	%	No.	%
normal	49	43.8%	13	10.7%
CAD	62	56.2%	100	89.3%

AF: Atrial fibrillation, SR: sinus rhythm, CAD: coronary artery disease

More than half of the patients in NVAF group had CAD (56.2%), while most of the patients in sinus group had CAD (89.3%).

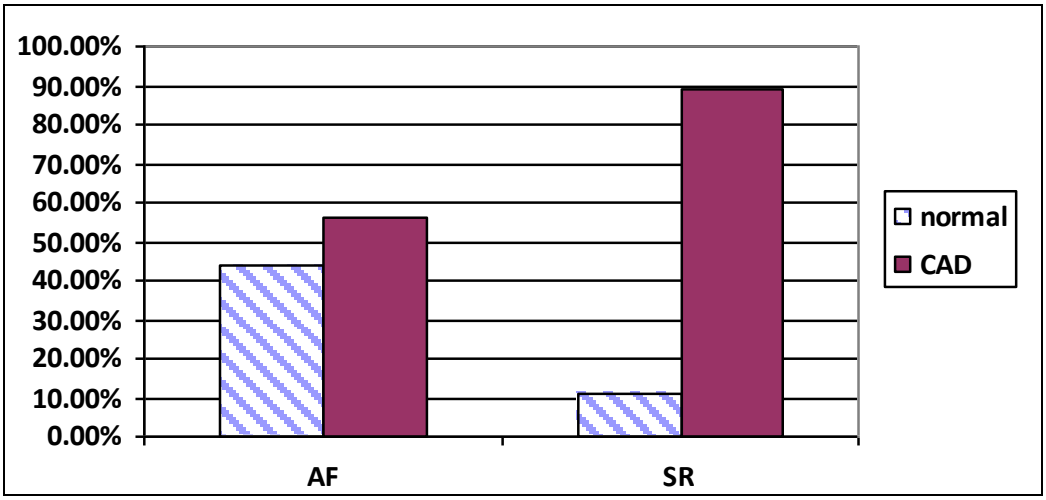

Fig 2: the coronary angiographic results in the two groups

Regarding the correlation between the coronary angiographic results and the gender we found the following in (table 3) and (figures 3and 4)

Table 3: the relation between gender and coronary angiographic results

Gender	Normal coronary angiography		CAD	
	NO.	%	NO.	%
Men	21	16.0%	110	84.0%
Women	41	44.1%	52	55.9%

Most of the men in the study have CAD representing (84%), while more than half of the women in the study have CAD representing (55.9%)

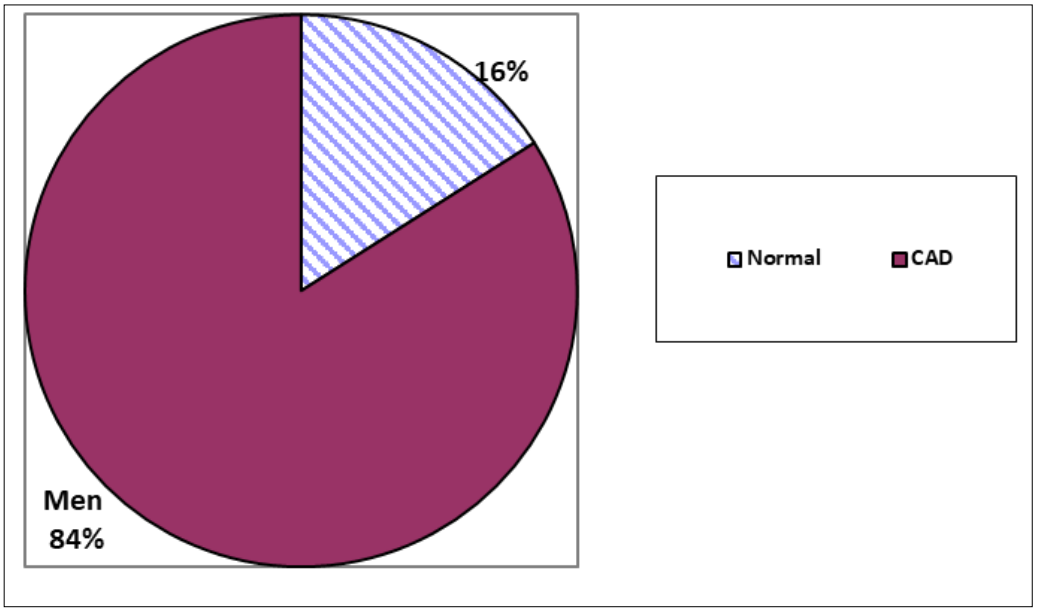

Fig 3: The percentage of CAD in MEN

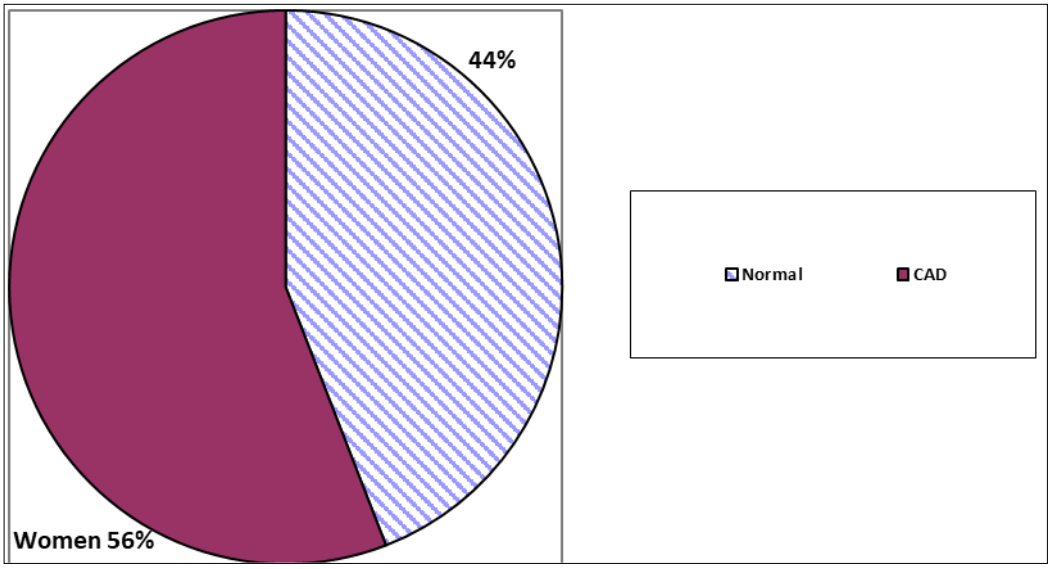

Fig 4: the percentage of CAD in Women

Discussion

In the present study we systemically assessed the epidemiology, clinical data, echocardiographic and coronary angiographic findings in patients with NVAF. We compared them with an equivalent number of patients with sinus rhythm in Sohag University coronary angiography cath. Lab. from the period from the first of January 2017 till end of December 2020.

Men were more than women in the two groups but significantly more in sinus group, most of men in this study had CAD (84%), consistent with Lukas J. Motloch *et al*. in their study of characteristics of coronary artery disease among patients with atrial fibrillation compared to patients with sinus rhythm which included 1581 patients divided into 2 groups AF (796 patient) and sinus group (785 patient) where men were also more in general, and more in sinus group representing (77.3%) and have more CAD as well [29]. and also consistent with Keitaro Senoo *et al*. in their national study of coronary artery diseases in Japanese patients with nonvalvular atrial fibrillation including 1835 patients where (75%) were men and CAD was more prevalent in men [30].

In the present study more than half of the patients with NVAF have CAD (56.2%). In contrast RAMSES study that included 1828 patient with NVAF, CAD represented only in 29.2% of patients [31], while Keitaro Senoo *et al*. in their national study of coronary artery diseases in Japanese patients with NVAF that included 1835 patients with NVAF,CAD was found only in 6.4% of patients [30].

The prevalence of CAD was significantly more in sinus group, and this reduces the rule of CAD as a main etiology of NVAF, However this point needs to be studied in larger number of patients.

One of our limitations is the number of the study population and a large scale of patients with NVAF need to be studied regarding this point, taking in consideration that those studies were on AF patient and not restricted to patients with NVAF.

Conclusion

Male gender is a strong risk factor for CAD in both sinus and NVAF patients as (84%) of male patients in our study had CAD. More than half of the patients with NVAF have CAD (56.2%), However, the prevalence of CAD was significantly more in sinus group (89.3%), and this limits the rule of CAD as a main cause of NVAF, However this point needs to be studied in larger number of patients.

References

1. Go AS, Hylek EM, Philips KA, Chang Y, *et al*. Prevalence of diagnosed atrial fibrillation in adults: national implications for rhythm management and stroke prevention: the anticoagulation and risk factors in atrial fibrillation (ATRIA) Study. JAMA,2001:285:2370-5.
2. January CT, Wann LS, Alpert JS, Calkins H *et al*. 2014 AHA/ACC/HRS guideline for the management of patients with atrial fibrillation. Journal of the American College of Cardiology,2014:64(21):2246-80.
3. Zoni-Berisso, and Massimo "Epidemiology of Atrial Fibrillation: European Perspective." Clinical Epidemiology,2014:213-220.
4. Paquette M, Roy D, Talajic M, Newman D *et al*. Role of gender and personality on quality-of-life impairment in intermittent atrial fibrillation. Am J Cardiol,2000:86(7):764-8.
5. Kannel WB, Abbott RD, Savage DD, McNamara PM Epidemiologic features of chronic atrial fibrillation: the Framingham study. N Engl J Med,1982:306(17):1018-22.
6. Flegel KM, Shipley MJ, Rose G. Risk of stroke in non-rheumatic atrial fibrillation. Lancet,1987:1:526-9.
7. Kannel WB, Abbott RD, Savage DD, McNamara PM. Coronary heart dis-ease and atrial fibrillation: the Framingham Study. Am Heart J,1983:106:389-96.
8. Krahn AD, Manfreda J, Tate RB, Mathewson FA *et al*. The natural history of atrial fibrillation: incidence, risk factors, and prognosis in the Manitoba Follow-Up Study. Am J Med,1995:98:476-84.
9. Psaty BM, Manolio TA, Kuller LH, Kronmal RA, *et al*. Incidence of and risk factors for atrial fibrillation in older adults. Circulation,1997:96:2455-61.
10. Dries DL, Exner DV, Gersh BJ, Domanski MJ *et al*. Atrial fibrillation is associated with an increased risk for mortality and heart failure progression in patients with asymptomatic and symptomatic left ventricular systolic dysfunction: a retrospective analysis of the SOLVD trials. Studies of left ventricular dysfunction. J Am Coll Cardiol,1998:32:695-703.
11. Lip GY, Beevers DG. ABC of atrial fibrillation. History, epidemiology, and importance of atrial fibrillation. BMJ,1995:311:1361-3.
12. Schoonderwoerd BA, Van Gelder I, Crijns HJ. Left ventricular ischemia due to coronary stenosis as an unexpected treatable cause of paroxysmal atrial fibrillation. J Cardiovasc Electrophysiol 1999; 10:224–8.
13. Wattigney WA, Mensah GA, Croft JB. Increased atrial fibrillation mortality: United States, 1980–1998. Am J Epidemiol,2002:155:819-26.
14. Pizzenetti F, Turazza FM, Franzosi MG, Barlera S *et al*. GISSI-3 Investigators. Incidence and prognostic significance of atrial fibrillation in acute myocardial infarction: the GISSI-3 data. Heart,2001:86(5):527-532.
15. Gersh BJ, Tsang TSM, Barnes ME, Seward JB, The changing epidemiology of non-valvular atrial fibrillation: The role of novel risk factors. Eur Heart J Supplements,2005:7(Suppl C):C5-C11.
16. Wilhelmsen L, Rosengren A, Lappas G, Hospitalizations for atrial fibrillation in the general male population: morbidity and risk factors. J Intern Med,2001:250(5):382-389.
17. Crijns HJ, Van Gelder IC, Van Gilst WH, Hillege H *et al*. Serial antiarrhythmic drug treatment to maintain sinus rhythm after electrical cardioversion for chronic atrial fibrillation or atrial flutter. Am J Cardiol,1991:68: 335-41.
18. AFFIRM Investigators Baseline characteristics of patients with atrial fibrillation: the AFFIRM study. Am Heart J,2002:143(6): 991-1001.
19. Hohnloser SH, Crijns HJ, van Eickels M, Gaudin C *et al*. ATHENA Investigators. Effect of dronedarone on cardiovascular events in atrial fibrillation. N Engl J Med,2009:360:668-678.
20. Otterstad JE, Kirwan BA, Lubsen J, De Brouwer S *et al*. Action Investigators. Incidence and outcome of atrial fibrillation in stable symptomatic coronary disease. Scandinavian cardiovascular journal,2006:40:152-159.
21. Cameron A, Schwartz MJ, Kronmal RA, Kosinski AS, Prevalence and significance of atrial fibrillation in coronary artery disease (CASS Registry). Am J Cardiol,1988:61:714-717.
22. Haddad AH, Prchkov VK, Dean DC, Chronic atrial fibrillation and coronary artery disease. J Electrocardiol,1978:11:67-9.
23. Cheng TO. Coronary artery disease as an uncommon cause of chronic atrial fibrillation. Clin Res,1974:22:268A.
24. Zipes DP. Specific Arrhythmias: Diagnosis and Treatment. In: Braunwald E, editor. Heart Disease. A Textbook of Cardiovascular Medicine. Philadelphia: W.B. Saunders, 1984, 700.
25. Van Gelder IC, Groenveld HF, Crijns HJ, Tuininga YS, Tijssen JGP *et al*. Race II Investigators. Lenient versus strict rate control in patients with atrial fibrillation. N Engl J Med,2010:362(15):1439-1441.
26. Choi EK, Choi SI, Rivera JJ, Nasir K *et al*. Coronary computed tomography angiography as a screening tool for the detection of occult coronary artery disease in asymptomatic individuals. J Am Coll Cardiol,2008:52(5):357-65.

27. Camm AJ, Kirchhof P *et al*. Guidelines for the management of atrial fibrillation: the Task Force for the Management of Atrial Fibrillation of the European Society of Cardiology (ESC). European Heart Rhythm Association; European Association for Cardio-Thoracic Surgery. Eur Heart J,2010:31(19):2369-429.
28. Anwar Santoso, Sunu B. Raharjo, (2020) Combination of Oral Anticoagulants and Single Antiplatelets versus Triple Therapy in Nonvalvular Atrial Fibrillation and Acute Coronary Syndrome: Stroke Prevention among Asians. Int J Angiol,2020:29:88-97.
29. Lukas J. Motloch, Sara Reda, Robert Larbig, *et al*. Characteristics of coronary artery disease among patients with atrial fibrillation compared to patients with sinus rhythm Hellenic Society of Cardiology,2017:58:204e212**.**
30. Keitaro Senoo, Shinya Suzuki, Koichi Sagara *et al*. Coronary artery diseases in Japanese patients with nonvalvular atrial fibrillation, Journal of Cardiology,2014:63:123-127**.**
31. Volkan Dogana, Özcan Başarana, Osman Beton *et al*. Coronary artery disease in outpatients with nonvalvular atrial fibrillation: results from the multicenter RAMSES study Coron Artery Dis,2016:27(6):497-503.