Original Research Article

Delta of Egypt Atrial Fibrillation Registry Phase 2

Abstract

Background: Atrial Fibrillation (AF) is the most common cardiac arrhythmia found in clinical practice. The estimated prevalence of AF in adults currently ranges between 2% and 4% with higher incidence and prevalence rates in developed countries [1, 2].. AF prevalence increases with advancing age, and with some cardiac and non-cardiac disorders, also it may exist in the absence of any conditions [2]. We aimed to determine patient characteristics, practice patterns, management strategies and outcomes of atrial fibrillation in the region of delta of Egypt.

Methods: This registry-based cross-sectional study included 1000 atrial fibrillation patients (with any AF patterns) who were admitted to ER in cardiac centers and hospitals in the region of middle Delta of Egypt from April 2020 to March 2021.

Results: 267 patients (26.7%) were unstable. Hypertension, coronary disease, and heart failure remain common comorbidities in our AF registry where hypertension account alone for about half the patients of atrial fibrillation. Rheumatic valvular heart disease, used to be an important underlying disease for the development of AF, still about 25.5% by echocardiography. Lone AF still high 20.6%. CHA2DS2VASc score ≥2 is 83.5%. The large number of patients received pharmacological medications for rate control about 52.7% of the patients and about 30.3% of the patients received pharmacological medications for the cardioversion to the sinus rhythm and small number of the patients received electrical cardioversion about 7%.

Conclusions: Hypertension, coronary disease, and heart failure remain common comorbidities in AF. Rheumatic valvular heart disease is still about 25.5% of the total

registry. Amiodarone is the commonest antiarrhythmic drugs (AAD) used. lone AF still high 20.6%. minimal use of novel oral anticoagulant (OAC).

Keywords: Atrial fibrillation, registry, cardiac arrhythmia, hypertension, coronary disease, and heart failure

Introduction

Atrial Fibrillation (AF) is the most common cardiac arrhythmia found in clinical practice. The estimated prevalence of AF in adults currently ranges between 2% and 4% with higher incidence and prevalence rates in developed countries [1, 2].

AF prevalence increases with advancing age, and with some cardiac and non-cardiac disorders, also it may exist in the absence of any conditions [2].

AF risk factors include hypertension, valvular heart disease, coronary artery disease, obesity, diabetes mellitus, chronic kidney disease, COPD, Obstructive sleep Apnea, Hypertrophic cardiomyopathy and after cardiac surgery [3].

Despite the massive progress in the management of patients with atrial fibrillation, the morbidity and mortality rates of AF remain high, as AF is still one of the major causes of stroke, heart failure, sudden death, and it is independently associated with a two-fold increased risk of all-cause mortality in women and a 1.5-fold increase in men [4, 5].

Oral Anticoagulants therapy can prevent the majority of ischemic strokes in AF patients and can prolong life [6].

Disease registries play an important part in improving health outcomes by determining patient characteristics, management, and adherence of practice guidelines.

Delta of Egypt Atrial Fibrillation Registry (DEAF) phase 1 was published in 2019 and AF registry in the region of the Delta of Egypt [7], therefore this is the phase 2 of DEAF registry and we aim to carry out larger registry recruiting more hospital and more patients over Delta hospitals.

The aim of this registry is to determine patient characteristics, practice patterns, management strategies and outcomes of atrial fibrillation in the region of delta of Egypt using the registry design.

Patients and Methods

This registry-based cross-sectional study included 1000 atrial fibrillation patients (with any AF patterns) who were admitted to ER in cardiac centers and hospitals in the region of middle Delta of Egypt. The registry took place in (Tanta, Elmahalla, Shebin-Elkom, Damanhour, Banha, Mansoura, Zagazig, Kafr-Elsheikh and Cairo) from April 2020 to March 2021.

All patients with AF, regardless of the pattern, in the region of middle Delta of Egypt were included.

Patients younger than 18 years old and those from regions other than the ones mentioned above were excluded.

All patients were subjected to the following: Full history taking, analysis of Atrial Fibrillation and medications during admission and on discharge

All procedures involving human participants performed in this study was in accordance with the ethical standards of Tanta University's ethical committee and its later amendments or comparable ethical standards and an informed written consent were taken after informing the patients about the procedure

Statistical analysis:

Statistical analysis was done by SPSS v26 (IBM Inc., Chicago, IL, USA). Continuous variables were summarized using means or medians based on the normality; normally distributed variables were summarized using the mean and standard deviation (SD), while the non-normally distributed variables were summarized using the median. Categorical data were summarized as the frequency and percentage.

Results

We screened 1000 patients in one year. All patients' data were collected from the assigned governorates in the Delta. 166 patients (16.6%) were from Tanta, 94 patients (9.4%) were from Damanhour, 75 patients (7.5%) were from Banha, 73 patients (7.3%) were from Shebin-Elkom, 195 patients (19.5%) were from Cairo, 89 patients (8.9%) were from Mansoura, 130 patients (13%) were from Zagazig and finally 178 patients (17.8%) were from kafr-ELshekh.

Basic data of the patients and vital status are shown in **Table 1.**

Table 1: Basic data of the patients and vital status (n=1000)

		NO	%
Age	**Min – max** **Mean ± SD** **Median**	24-92 59.43 ± 15.26 60	
Gender	**Male**	541	54.1%
	Female	459	45.9%
Presentation	**Stable**	733	73.3%
	Unstable (*)	267	26.7%

(*) systolic blood pressure <90mmHg, diastolic blood pressure <60mmHg, patients presented with heart failure, recent acute coronary syndrome, or stroke.

Vital data upon admission are shown in Table 2

Table 2: Vital data of the patients in the emergency room (n = 1000).

Vital data	
Systolic Blood Pressure (mmHg)	
Min. – Max	60.0 – 220.0
Mean ± SD.	112.56 ± 31.75
Median	115.0
Diastolic Blood pressure (mmHg)	
Min. – Max	40.0 – 140.0
Mean ± SD.	71.82 ± 17.23
Median	68.5
Pulse Rate (bpm)	
Min. – Max	50.0 – 165.0
Mean ± SD.	113.3 ± 22.86
Median	108.0
Respiratory rate (cycle/minute)	
Min. – Max	13 – 36
Mean ± SD.	23.41 ± 5.46
Median	21

Body temperature (º C)	
Min. – Max	36.3 – 38.2
Mean ± SD.	36.9 ± 0.54
Median	37.0

ºC: degree Celsius, bpm: beat /minute.

Medical history of the patients, triggering factors and co-morbidities are shown in

Table 3

Table 3: Medical history of the patients. (n = 1000)

Disease	No.	%
Coronary artery disease	324	32.4
HTN	498	49.8
Smoking	438	43.8
Heart failure	236	23.6
RHD	167	16.7
Cardiac surgery before	111	11.1
TIA	63	6.3
Vascular disease	42	4.2
Thromboembolic disease	118	11.8
Dialysis	35	3.5
COPD	72	7.2
Thyroid disease	68	6.8
Anemia	113	11.3
No obvious etiology of AF	206	20.6
Drug history	87	8.7
DM	314	31.4
Dyslipidemia	429	42.9
Congenital heart disease	41	4.1
Sleep apnea	47	4.7
Emphysema	33	3.3
Alcohol consumption	26	2.6
Carotid stenosis	64	6.4
Valvular heart disease	255	25.5
Chronic kidney disease	76	7.6

HTN: hypertension; RHD: rheumatic heart disease; TIA: transient ischemic attack, COPD: chronic obstructive pulmonary disease ; DM: diabetes mellitus, AF: atrial fibrillation.

History of atrial fibrillation andanalysis of the frequency and outcome are shown in **Table 4**.

Table 4: History of atrial fibrillation and analysis of the frequency outcome (n=1000)

		No	%
Has a past history of atrial fibrillation		472	47.2
Past intervention	Electrical	101	10.1
	pharmacological	391	39.1
	Both (EandP)	39	3.9
	Catheter ablation	19	1.9
	Surgical ablation	0	0
	AV node ablation	0	0
	LT atrial appendage ablation	0	0
Primary reason for ER visit	palpitation	498	49.8
	Cardiac cause other than palpitation	406	40.6
	Non cardiac cause	96	9.6
Atrial fibrillation symptoms at time of presentation	Asymptomatic	124	12.4
	Palpitation	498	49.8
	Chest pain	150	15
	Dyspnea	194	19.4
	Syncope	34	3.4
Type of atrial fibrillation on presentation	First diagnosed	528	52.8
	paroxysmal	156	15.6
	persistent	84	8.4
	Permanent	232	23.2
Cardio version in ER and management	Spontaneous	73	7.3
	electrical	92	9.2
	pharmacological	357	35.7
	Rate control	478	47.8
	other	0	0
PTN rhythm at time discharge from ER	Sinus	462	46.2
	Atrial fibrillation	530	53.0
	Others (SVT, VT and VF)	8	0.8
PTN outcome From ER	Died	12	1.2
	Discharged Home	215	21.5
	Transferred to another hospital	48	4.8
	Admitted	725	72.5

CAD, coronary artery disease; ACS, Acute Coronary Syndrome ; PCI, Percutaneous Coronary Intervention ; CABG, Coronary Artery Bypass Graft; (EandP) , Electrical and pharmacological ; AV, Atrio-ventricular ; ER, Emergency Room ; SVT, supraventricular tachycardia ; VT, Ventricular tachycardia ; VF, Ventricular fibrillation

ECG findings upon admission are shown in **Table 5**

Table 5: ECG findings upon admission (n=1000)

ECG findings		No	%
Rate	Min. – Max	50 – 165.0	
	Mean ± SD	111.2 ± 24.35	
	Median	105.0	
Axis	Normal	617	61.7
	Rt -axis deviation	137	13.7
	Lt- axis deviation	246	24.6
QRS-complex	Normal	837	83.7
	Wide complex	76	7.6
	LBBB	87	8.7
ST segment depression or inverted T wave		324	32.4

RT=right, LT=left, LBBB =Left Bundle Branch Block

Transthoracic echocardiography (TTE) parameters are shown in Table 6

Table 6: Transthoracic echocardiographic (TTE) parameters (n=838)

					NO	‰
LV Ejection fraction	838	Min. – Max 15-72 Mean ± SD. 36.97±10.35 Median 33.0				
		EF <40%			236	28.1
		EF ≥40%			602	71.8
LV dimensions	838	Normal			604	72.08
		Dilated			234	27.92
Regional wall motion at rest					324	38.6
Pulmonary HTN	838	Normal			421	50.24
		Mild			168	20.05
		Moderate			142	16.95
		Severe			107	12.77
Valvular Lesion	163	Mitral	STENOSIS (n=110)	Mild	27	24.54
				Moderate	46	41.81
				Severe	37	33.63
			REGURGE (n=53)	Mild	19	35.84
				Moderate	9	16.98
				Severe	25	47.17
	Combined mitral stenosis and Regurge				25	2.98
	159	Aorta	STENOSIS (n=81)	Mild	29	35.8
				Moderate	34	41.9
				Severe	18	22.2
			REGURGE (n=78)	Mild	30	38.46
				Moderate	19	24.35
				Severe	29	37.17
	Combined Aortic stenosis and regurge				33	3.9
	Bi-valvular lesion Aortic and Mitral				67	7.9
Others	Prosthetic valve				76	9.1

NO=number , EF = Ejection Fraction

Laboratory tests:

Laboratory parameters on presentation are shown in **Table 7**

Table 7: Laboratory parameters on presentation

	N	Min - Max	Mean ± SD	Median
Creatinine (mg/dl)	220	0.65 – 9.0	1.63 ± 1.12	1.4
Urea (mg/dl)	220	18.0-217.0	69.47±37.64	74.5
Na (m Eq/L)	220	110.0-156.0	137.48±9.34	139
K (m Eq/L)	220	2.66-6.5	4.18±0.57	4.1
HGB (gm/dL)	190	7.42-14.0	10.67±1.75	10.9
INR unit	200	1.21-5.67	2.46±0.95	2.4
Troponin (ng/mL)	207		NO	%
		Positive	96	46.4
		Negative	111	53.6

N: number; INR, International Normalized Ratio; HGB, Hemoglobin; Na, Sodium; K, potassium; mg/, milligrams per deciliter; m Eq/L, Mill equivalents Per Liter; gm/dl, gram/deciliter; ng/mL, nanograms per milliliter.

Pharmacological medical therapy in emergency room is shown in **Table 8**.

Table 8: Pharmacological medical therapy in the emergency room (n=1000)

	The medication	NO	‰
Medications for rate control (N=275)	Class II anti- arrhythmic drug e.g. propranolol, carvedilol, metoprolol and bisoprolol	527	52.7
	Class 4 anti-arrhythmic drugs e.g. verapamil and diltiazem	303	30.3
	Digitalis	341	34.1
	Combined 2 medications	307	30.7
	Combined 3 medications	569	56.9
Medications for rhythmic control (N=155)	Class 1 anti -arrhythmic drugs e.g. lidocaine and propafenone	46	4.6
	Class 3 anti-arrhythmic drugs e.g. Amiodarone	548	54.8
Anti- platelet drugs	Aspocid and plavix	298	29.8
Anti-coagulant	Heparin and enoxaparine	383	38.3
Anti-failure Drugs	Diuretics	244	24.4

Clinical risk factors for stroke, transient ischemic attack, and systemic embolism in the survey were assessed using CHA2DS2VASc score. 165 patients 16.5 % had score ≤ 1, while 835 patients 83.5 % had score ≥ 2. **Table 9**

Table 9: CHA2DS2VASc scoring system in the survey (n=1000)

CHA_2DS_2VASc score

	number	%
score ≤ 1	165	16.5
score ≥ 2	835	83.5
Congestive heart failure	236	23.6
Hypertension	498	49.8
Age 75 year or older	159	15.9
Diabetes mellitus	314	31.4
Previous stroke , transient ischemic attack	63	6.3
Vascular disease	42	4.2
Age 65-74 year	232	23.2
Sex category (female)	459	45.9

Medications on discharge are shown in Table 10

Table 10: Medications on discharge from emergency room (n=1000)

Medication group	The medication	NO	%
B – blockers	Propranolol	101	10.1
	Carvedilol	111	11.1
	Metoprolol	35	3.5
	Bisoprolol	244	24.4
	Atenolol	58	5.8
Ca^{+2}– Channel blockers	Verapamil	209	20.9
	Diltiazem	97	9.7
Other medications	Digitalis	352	35.2
	Propafenon	31	3.1
	Amiodarone	233	23.3
Anti-platelets medications	Aspocid	687	68.7
	Clopidogrel	183	18.3
	Ticagrelor	62	6.2
Diuretics	Furosemide	395	39.5
ACE inhibitors	Captopril	538	53.8
Anti- coagulant (Vit -K antagonist	Warfarin	726	72.6
Novel anti-coagulant	Dabigatran	0	0
	Apixaban	46	4.6
	Edoxaban	0	0
	Rivaroxaban	63	6.3
Dual anti-platelet	Aspocid and Clopidogrel	241	24.1
Triple therapy	Aspocid, Clopidogrel & warfarin	107	10.7

Discussion

Guideline-adherent therapy of AF has been shown to improve outcomes, but the management of patients with AF in clinical practice sometimes may differ from evidence-based recommendations [8, 9].

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In our DEAF registry, we reported demographics, risk factors, co-morbidities, baseline clinical presentation, management and short-term outcomes in patients with atrial fibrillation.

The incidence of atrial fibrillation in males was more than females and these results agree with (PREFER in AF) [10] and (Gulf SAFE) [11] that may be due to the risk factors such as ischemic heart disease and HTN.

DEAF REGISTRY phase two mainly emergency room registry so 25.6% of the patients were unstable, while 74.4% was stable in attendance to the emergency room.

Although our patients were younger, they had comparable rates of comorbidities such as coronary artery disease, heart failure, stroke, and transient ischemic attack and higher rates of diabetes, smoking, and rheumatic heart disease.

That is close to what reported in GULF REGISTRY of atrial fibrillation [11] and (AFNET registry) [12].

A review of medical history and risk factors showed that a little less than half of our patients have reported a history of hypertension that is close to what reported by gulf registry of AF[11] ,while the risk factor of HTN in (AFNET registry) [12] and (PREFER in AF) [10] was higher by about 17% and from these ,the hypertension considered the most important risk factor in AF and the more burden of HTN on the developed countries.

Diabetes mellitus (DM) and dyslipidemia was reported as risk factors in about one third of the patients of atrial fibrillation the incidence is close to that in (GULF SAFE) [11] in DM and dyslipidemia, on the other hand the risk factor of DM on AF about 22.4% in (PREFER in AF) [10] , less by about 7% that may be explained by the bad habits of the patients in the developing countries make the patients more BMI than European patients [11]

and that predispose DM more than others, and increases the burden of DM on the developing countries.

We reported to have less COPD patients than (AFNET registry) [12] that explained mainly by under diagnosis of COPD in our region and underutilization of respiratory function test to aid in proper diagnosis.

History of rheumatic heart disease was reported in (16.7%) of patients while its prevalence was (16%) in GULF-REGISTRY [11] and its prevalence was (3.1%) in (AFNET registry) [12] although the prevalence is high in DEAF REGISTRY, the valvular heart disease reported to be the same in results in (DEAF REGISTRY) and (AFNET registry) [12] but the difference that in DEAF registry the more valvular heart disease is mainly rheumatic in origin.

According to smoking and alcohol consumption as risk factors, the smoking prevalence is the most in DEAF REGISTRY about (43.8%) then the tobacco come in the second level in the GULF –REGISTRY [11] about 23% then about 11.8% in (AFNET registry) [12] ,that is consistent with the WHO global status report on non- communicable diseases which showed an age-adjusted prevalence of daily tobacco smoking in Egypt in adults aged 15 years or older about (37.2%) in men and (0.6%) in women [13].

On the other hand, the alcohol consumption more in (GULF-REGISTRY) [11] then (AFNET registry) [12] then DEAF REGISTRY comes in the end of the prevalence of the predisposing factor to the atrial fibrillation.

The TIA and the stroke prevalence about (6%) in DEAF REGISTRY while in gulf registry was about 4% while in (AFNET registry) [12] it is less than that.it is mainly due to adherence of the EURO – countries to guidelines and less stroke outcome.

Chronic kidney disease about 7.6% patients and 3.5% of them on dialysis these results less than that of (AFNET registry) [12] and there was no results to compare it in (GULF-REGISTRY) [11].

Finally, the prevalence of lone AF about 20.6% close result to the (GULF SAFE) [11] and has some difference than (EORP-AF) [6] .Pilot General Registry as was evident in only a minority of patients (3.9%).

When we discuss the patterns of atrial fibrillation on presentation with GULF-REGISTRY and Germany (NET-WORK) of atrial fibrillation we found that our survey is close mainly to GULF-SURVEY in that:- most cases of atrial fibrillation are considered first diagnosed AF 52.8%, then permanent AF 23.2%,then paroxysmal AF 15.6% ,and small cases became persistent AF 8.4% came in the end of the survey ,when we compare the survey results with Germany (NET-WORK) of atrial fibrillation [12] we see that:- the main cases are permanent AF 32.8% ,then paroxysmal AF 30.2%, then persistent AF 19.5%, and the cases of first presentation of atrial fibrillation came in the end of the survey 10.8% . That is because most of our cases from emergency room.

About the intervention to the cases of atrial fibrillation we didn't find results in (GULF-SAFE) [11] to compare with it, but in (PREFER in AF) [10] we see the following difference the majority of our cases are considered to have rate control about (47.8%) then about (35.7%) of the cases do pharmacological cardioversion then about (9.2%) of the cases do electrical cardioversion and finally about (7.3%) of the cases returned spontaneously to their normal sinus rhythm , we notice that about half of our patient do rate control and that explain most of the cases came to the emergency room after the time when the cardioversion can performed according to the recent AF guidelines [14] and became chronic and nearly one third of them receive pharmacological cardioversion and small numbers of them receive electrical cardioversion because they were hemodynamically unstable , no one of the cases do

electro-physiological study and do rhythm control in the follow up, in difference to the study (PREFER in AF) [10] accepted number of cases do rhythm control in the follow up (3.4% of cases do catheter ablation ,while about 9.2% do electrical cardioversion in their follow up).

About patient outcome from the emergency room bout (72.5%) admitted and (21.5%) discharged to home and about (4.8%) transferred to another hospital and finally about (1.2%) died that explain the good hospital care to the AF patients from the large number of admissions and the small number of mortality. About the patients that transferred to another hospital that explain some shortage in some hospitals to give the medical management and low number of the ICU beds in these hospitals.

The median heart rate to the patients was 105, most of the patients were normal axis in the ECG, the rest of the patients were LT- axis about (24.6%) and the remaining patients (13.7%) were RT- axis, the patients that had narrow QRS-complex about (83.7%) and small number had wide QRS-complex about (7.6%) will the patient that had wide complex with LBBB pattern are about (8.7%).

And finally large number of patients has ST segment depression or inverted T wave about (32.4%). We did not have results to compare it in (GULF-SAFE) [11] but we found a large difference than (EORP-AF) [6].

Most of our patients had LVEF with a mean of 36.97 % and here we found some difference from the (EORP-AF) [6] Pilot General Registry as the patients had LVEF with a mean of 52.3% and that reflects that the heart failure had a large burden on the atrial fibrillation patients in Egypt. The valvular heart disease found in 50% of the patient by echocardiography and these results far from the (EORP-AF) [6] Pilot General Registry as the results of valvular heart disease was 63.5% but when we summarize the rheumatic patients as there was the (mitral valve disease and the prosthetic valve) they account about 25.5% of the total registry by echocardiography. And the difference between the data collected from the

history and from the investigations and that reflects that not all the patients know what the disease they have is.

In our study, the patients had CHA2DS2VASc score ≤1 are 16.5% of the total registry. While the patients that had had CHA2DS2VASc score ≥2 is 83.5% of the total registry when we compare the results with (PREFER in AF) [10] we found that the patient that had point 1 are about 10.1% while the patients that had point +2 about 84.1% and that reflects the more co-morbidities of the atrial fibrillations and the large numbers of patients that needs anticoagulants.

The large number of patients received pharmacological medications for rate control about 52.7% of the patients and about 30.3% of the patients received pharmacological medications for the cardioversion to the sinus rhythm and small number of the patients received electrical cardioversion about 7% when we compare these results with (EORP-AF) [6] Pilot General Registry we found that about 29.8% of the patients received pharmacological cardioversion and about 20.5% of the patients received electrical cardioversion, amiodarone is the commonest AAD used (26.6), while regarding rate control medications, beta-blockers and digoxin were more often used than non-dihydropyridine calcium-channel blockers.

Drug prescription patterns showed interesting changes over the last decade. In the present survey, amiodarone was the most commonly used AAD (23%), followed by sodium-channel blockers and that is nearly equal to the (EORP-AF) [6] Pilot General Registry, and similar pattern has been found in the (AFNET registry) [12], collected at the time of the EuroHeart survey [15], and is also reflected in the PREFER in AF dataset and different from the last decades in that : In the EuroHeart survey [15], Class Ic agents were used in 30%, while Class III agents were used in 35%.

The most medication prescribed for the patients as rate control is digitalis 34.1%, bisoprolol 30.3% and that is different from the recent AF guidelines [16] as digitalis prescribed as rate control whatever the indications.

OAC was used in more than 80% overall, most often vitamin K antagonists (72.6%), with novel OAC being still used in a minority. However, other antithrombotic (mostly antiplatelet therapy, especially aspirin) were still used in two-third of the patients and the gap between the result and the recent guidelines in the novel anti-coagulant, not the class -1 recommendations in the management of the AF patients where the warfarin still the frequently used OAC.

Conclusions:

Hypertension, coronary disease, and heart failure remain common comorbidities in AF. Rheumatic valvular heart disease is still about 25.5% of the total registry. Amiodarone is the commonest antiarrhythmic drugs (AAD) used. Lone AF still high 20.6%. minimal use of novel oral anticoagulant (OAC).

COMPETING INTERESTS DISCLAIMER:

Authors have declared that no competing interests exist. The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

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