



Delta of Egypt Atrial Fibrillation Registry Phase Two

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Background: Atrial Fibrillation (AF) is the most frequent cardiac arrhythmia found in clinical practice. The assessed frequency of AF in adults is between 2% and 4%, with greater incidence and frequency rates in developed nations [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 case characteristics, practice patterns, management strategies and outcomes of atrial fibrillation in the delta area of Egypt.

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

Results: 267 patients (26.7%) were unstable. Heart failure, hypertension, and coronary disease were still prevalent comorbidities in our AF dataset, where hypertension accounts for over 50% of all AF cases. Rheumatic valvular heart disorder was a major underlying disease for the development of AF, still about 25.5% by echocardiography. Lone AF still high 20.6%.

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CHA2DS2VASc score ≥ 2 is 83.5%. A high proportion of cases were treated with pharmaceuticals for rate control nearly 52.7% of the cases and nearly 30.3% of the cases were given pharmacological medications for the cardioversion to the sinus rhythm and a small proportion of the cases were given electrical cardioversion nearly 7%.

Conclusions: Coronary disease, hypertension, and heart failure were still usual comorbidities in AF. Rheumatic valvular heart disease is still about 25.5% of the total registry. Amiodarone is the most prevalent antiarrhythmic medications (AAD) used. Lone AF still high 20.6%. minimal use of novel oral anticoagulant (OAC).

Keywords: AF; hypertension; registry; coronary disease; cardiac arrhythmia; heart failure.

1. INTRODUCTION

Atrial Fibrillation (AF) is the most frequent cardiac arrhythmia found in clinical practice. The assessed frequency of AF in adults is between 2% and 4%, with greater incidence and frequency rates in developed nations [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 are hypertension, valvular heart disorder, obesity, chronic kidney disorder, COPD, coronary artery disorder, Obstructive sleep Apnea, DM, Hypertrophic cardiomyopathy and after cardiac surgery [3].

Despite significant advancements in the treatment of cases with AF, the morbidity and mortality rates of AF were still high, as AF is among the primary causes of stroke, heart failure, and sudden death, and It is independently linked to a twofold greater risk of all-cause mortality in females and a 1.5fold increased risk in males [4,5].

Oral Anticoagulants treatment could avoid the majority of ischemic strokes in AF cases and can extend 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 location of the Delta of Egypt [7], therefore this is the phase 2 of DEAF registry and we aim to carry out wider database increasing hospital recruitment and cases over Delta hospitals.

The objective of this database was to determine case characteristics, practice patterns, management strategies and results of AF in the delta area of Egypt using the registry design.

2. PATIENTS AND METHODS

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

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

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

Each case was subject to: Full history taking, analysis of AF and medications during admission and on discharge.

This study followed all procedures including human volunteers in compliance 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

2.1 Statistical Analysis

SPSS v26 was utilized to perform statistical analysis (IBM Inc., Chicago, IL, USA). The mean and standard deviation (SD) were summarized regularly distributed variables, while the median was summarized non-normally distributed variables. We utilised frequency and proportion to summarize categorical data.

3. 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 cases and vital status are demonstrated in Table 1.

Table 1. Basic data of the cases and vital status (n=1000)

		NO	%
Age	Min – max	24-92	
	Mean ± SD	59.43 ± 15.26	
	Median	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, cases had heart failure, recent acute coronary syndrome, or stroke

Vital data upon admission are expressed 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 (° C)	
Min. – Max	36.3 – 38.2
Mean ± SD.	36.9 ± 0.54
Median	37.0

°C: degree Celsius, bpm: beat /minute

Medical history of the cases, triggering factors and co-morbidities are shown in Table 3.

Table 3. Medical history of the cases. (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

Disease	No.	%
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 AF and analysis of the frequency and outcome are shown in Table 4.

Table 4. History of AF and analysis of the frequency outcome (n=1000)

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

		No	%
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; (E and P), 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. 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	Mild	27	24.54	
			Moderate	46	41.81		
			Severe	37	33.63		
		REGURGE	Mild	19	35.84		
			Moderate	9	16.98		
			Severe	25	47.17		
		Combined mitral stenosis and Regurge			25	2.98	
		Aorta	159	STENOSIS	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			

		NO	%
Others	Combined Aortic stenosis and regurge	33	3.9
	Bi-valvular lesion Aortic and Mitral	67	7.9
	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 \pm SD	Median
Creatinine (mg/dl)	220	0.65 – 9.0	1.63 \pm 1.12	1.4
Urea (mg/dl)	220	18.0-217.0	69.47 \pm 37.64	74.5
Na (m Eq/L)	220	110.0-156.0	137.48 \pm 9.34	139
K (m Eq/L)	220	2.66-6.5	4.18 \pm 0.57	4.1
HGB (gm/dL)	190	7.42-14.0	10.67 \pm 1.75	10.9
INR unit	200	1.21-5.67	2.46 \pm 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 Clopidogrel	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 \leq 1, while 835 patients 83.5% had score \geq 2 Table 9.

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

CHA₂DS₂VASc 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	Aspidol	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	Aspidol and Clopidogrel	241	24.1
Triple therapy	Aspidol, Clopidogrel & warfarin	107	10.7

4. DISCUSSION

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

In the DEAF database, we documented the demographics, baseline clinical presentation, management, co-morbidities, risk factors, and short-term outcomes in AF cases.

The incidence of AF in females was less than males and these findings confirm (PREFER in AF) [10] and (Gulf SAFE) [11], this could be attributable to risk factors such as ischaemic heart disease and hypertension.

DEAF REGISTRY phase two principally emergency room registry so 25.6% of the cases were unstable, while 74.4% was stable in attending to the emergency room.

Despite being younger, our cases had comparable rates of smoking, transient ischemic

attack heart failure, higher rates of diabetes, CAD, stroke, and rheumatic heart disease.

This is similar to the reported incidence of atrial fibrillation in the GULF REGISTRY [11] and (AFNET registry) [12].

An examination of medical history and risk variables revealed that somewhat less than half of our cases had a hypertension history comparable to that described by the Gulf Registry of AF [11], while the risk factor of HTN in (AFNET registry) [12] and (PREFER in AF) [10] was greater by nearly 17% and from these. HTN is regarded as the major risk cause for AF and the greater the impact of HTN on developed nations.

Dyslipidemia and DM were recognised as risk factors in around third of AF cases; the frequency is similar to that in (GULF SAFE) [11] in dyslipidemia, and DM, nonetheless, the risk factor for DM on AF is almost 22.4 % (PREFER in AF) [10], less by almost 7% which could be justified by The poor practises of developing nations make the cases high BMI than European cases [11] and that are more predisposing factors to DM than others, and raises the cost of DM for underdeveloped nations.

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.

A previous diagnosis of rheumatic heart disorder was documented in (16.7%) of cases as its incidence was (16%) in GULF-REGISTRY [11] and its incidence was (3.1%) in (AFNET registry) [12] Despite the elevated frequency in DEAF REGISTRY, valvular heart disorder was found to be identical between DEAF REGISTRY and the total population (AFNET registry) [12] However, the most of valvular heart disorder in the DEAF registry is of rheumatic cause.

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 corresponds with the WHO global status report on non-communicable disorders that indicated an age-adjusted frequency of daily tobacco smoking in Egypt in adults aged more than or equal 15 years nearly (37.2%) in men and (0.6%) in women [13].

On the contrary, 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 obvious in only a minority of cases (3.9%).

As we examined the forms of AF on presentation with GULF-REGISTRY and Germany (NET-WORK) of AF, we discovered that our study is most similar to GULF-SURVEY in that:- 52.8 % of AF cases are classified as first diagnosed AF, then 23.2% are permanent AF then 15.6% paroxysmal AF, and few patients developed persistent AF 8.4% occurred at the end of the study ,as we contrast the study outcomes with Germany (NET-WORK) of AF [12] and observe that:- the major patients are permanent AF 32.8%, paroxysmal AF 30.2%, persistent AF 19.5%, and the first patients of AF were identified near the conclusion of the investigation 10.8% . This is due to the majority of our patients originate through the emergency room.

Regarding the mediation in AF patients we discovered no outcomes in (GULF-SAFE) [11] to compare with it, but in (PREFER in AF) [10] we observe the subsequent change most of our patients are seen to possess rate control over (47.8%) then nearby (35.7%) of the patients undergo pharmacologic cardioversion then nearby (9.2%) of the patients do electrical cardioversion and lastly approximately (7.3%) of the patients spontaneously reverted to their regular sinus rhythm, We see that almost 50% of our patients use rate control, which explains why the majority of cases presented to the emergency department beyond the time during which cardioversion could be done in accordance with the most recent AF recommendations [14] and developed chronic and almost a third of them get

pharmaceutical cardioversion and a minority of them undergo electrical cardioversion because they had an unstable hemodynamic state, none of the patients undergo electro-physiological testing and rhythm control during the follow-up (PREFER in AF) [10] Acceptable proportion of patients perform rhythm control in the follow-up (3.4%) of patients perform catheter ablation ,while almost 9.2% perform electrical cardioversion.

About patient outcome from the emergency room about (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 amount 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].

The majority of our cases had an average LVEF of 36.97 %, and we noticed some variation from the norm (EORP-AF) [6] Pilot General Registry as the cases got LVEF with a average of 52.3% and indicates that the cardiac failure was with high cost on the AF cases in Egypt. The valvular heart disorder observed in half of the cases by echocardiography and these outcomes far from the (EORP-AF) [6] Pilot General Registry as a result of valvular heart disorder was 63.5%, however, as we summarize rheumatic cases (mitral and prosthetic valve disorders), they contribute to approximately 25.5% of the overall registry by echocardiography. And the gap among the information acquired from the patient's history and the analyses demonstrates that not all cases are aware of their ailment.

In our study, the cases 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.

A high proportion of cases were treated with pharmaceuticals for rate control approximately 52.7% and 30.3% of the cases were given pharmacological treatment for the cardioversion to the sinus rhythm and a minority of cases got electrical cardioversion approximately 7% when We contrast these outcomes to (EORP-AF) [6] Pilot General Registry we noticed that approximately 29.8% of the cases were given pharmacological cardioversion and approximately 20.5% of the cases were given electrical cardioversion, amiodarone is the most prevalent AAD (26.6) utilized, In terms of drugs for rate control, beta-blockers and digoxin were utilised high frequently than non-dihydropyridine calcium-channel blockers.

In the past decade, there have been notable shifts in prescription drug habits. In the current study, amiodarone was more often employed AAD (23%), then sodium-channel blockers, which was approximately equivalent in prevalence (EORP-AF) [6] Pilot General Registry, and same forms have been discovered in the (AFNET registry) [12], data acquired during 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], Agents of Class Ic were used in 30%, while Agents of Class III were used in 35%.

The most commonly given medications for rate control are digitalis (34.1%) and bisoprolol (30.3%), which differs from the most current AF standards [16] as digitalis approved as rate control whatever the symptoms.

OAC was utilized in more than 80% overall, highly frequently vitamin K antagonists (72.6%), with novel OAC being still used in a minority. Yet, other antithrombotic (mostly antiplatelet therapy, especially aspirin) were still utilized in two-third of the cases and the gap between the results and the most recent guidelines for new anticoagulants, not the class -1 recommendations for the management of AF

cases, where warfarin remains the most commonly used OAC.

5. CONCLUSIONS

Coronary disease, hypertension, and heart failure were still frequent comorbidities in AF. Rheumatic valvular heart disease is still about 25.5% of the total registry. Amiodarone is the commonest AAD used. Lone AF still high 20.6%. minimal use of novel OAC.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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